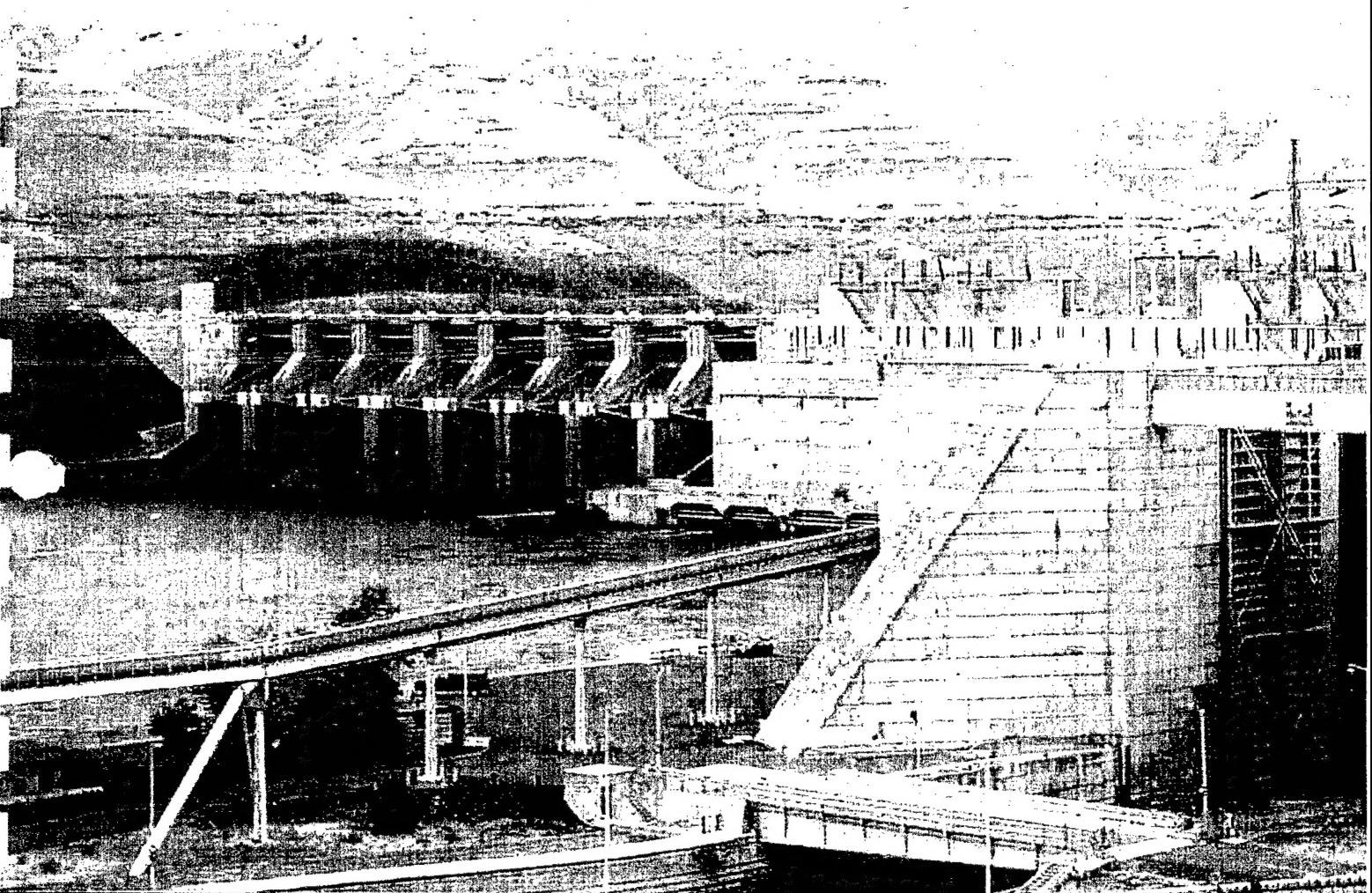


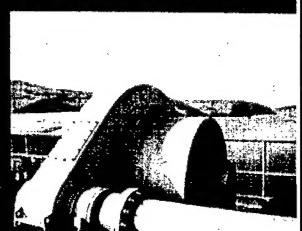
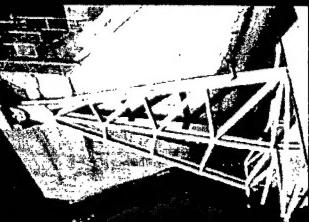
February 2001

Little Goose Dam

Radial Gate Inspection and Testing



US Army Corps of Engineers, Walla Walla District



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LITTLE GOOSE DAM RADIAL GATE INSPECTION AND TESTING

INTRODUCTION

Purpose

The Corps of Engineers, Walla Walla District, requires a comprehensive evaluation of the radial gates at Little Goose Dam. The District retained HDR Engineering, Inc. to perform inspection and testing of the radial gates through Task Order No. 5 under Contract DACW68-00-D-0001. The task order scope of work includes review of project information, an initial meeting and inspection, comprehensive field inspection of the radial gates, testing of gate hoist machinery, recording trunnion movement, and preparation of a report.

Scope of Investigation

The scope of this investigation includes:

- Review of design, construction, maintenance and operations information provided by the District.
- Hands-on visual inspection of accessible upstream and downstream portions of eight radial gates.
- Visual inspection of the hoists and hoist equipment.
- Testing of gates and hoists while operating.
- Recording trunnion movements while raising gates in both loaded and unloaded condition.
- A report including documentation of the design and operation of the gates and hoists, inspection and testing results, conclusions, and recommendations.

Limitations

The services under this contract include the professional opinion and judgment on the data and information reviewed. The conclusions and recommendations presented in this report are based on the information provided by the District and the inspection of the radial gates and hoists. The inspection was visual only and only accessible portions of the components were inspected. No nondestructive tests or laboratory testing was conducted in the course of the inspection.

PROJECT BACKGROUND

Project Description

Little Goose Dam is located in southeastern Washington on the Snake River, 28.7 river miles upstream of Lower Monumental Dam, and 70.3 miles above its confluence with the Columbia River.

The main project structures include a powerhouse, concrete spillway, navigation lock, fish facilities, concrete non-overflow sections, and a rockfill embankment on the north shore. The dam is 2,655 feet long including the embankment. Construction of the project began in June 1963 and was completed in January 1970.

The spillway is 512-feet-long and is located about mid-river. The spillway consists of eight radial gate controlled bays separated by 14-feet-wide piers. The radial gates are each 50-feet wide by 60-feet high. The gates are numbered 1 to 8 from left to right looking downstream. The spillway structure has a maximum height of 204.4 feet with the deck at Elev. 651.0. The spillway crest is at Elev. 581.0 and the top of gates at Elev. 640.0. The reservoir stores 565,000 acre-feet at normal full pool (Elev. 638.0).

The Spillway Design Flood (SDF) is 850,000 cfs. The spillway has a design capacity of 850,000 cfs at reservoir level Elev. 646.5. The maximum spillway capacity at normal full pool (Elev. 638.0) is 676,000 cfs. At Little Goose Lock and Dam for the period from 1951 to 2000 the maximum flood of record was 306,700 cfs on June 18th, 1974. Peak flow outside the period of record is 409,000 cfs on June 5th 1894. This value was computed from flood marks by the U.S. Weather Bureau.

Gate Design and Construction

The Corps of Engineers designed the gates and project facilities. The gates were fabricated by Pacific Car and Foundry of Seattle, Washington.

The Walla Walla District provided copies of the engineering drawings and shop drawings for the gates. The gate and hoist specifications were also provided as well as design calculations for the gates. The following information was obtained from these documents.

The 3/8-inch to 1/2-inch thick skin plate is supported by vertical ST10WF31 purlins. The skin plate is 3/4-inch thick on each end of the gate to act as a wear surface for the lifting cables. The purlins are connected to three horizontal plate girders. Each horizontal girder is supported by 14WF gate arms. The gate arms are braced with 14 WF members and there are ST7WF15 braces between the downstream flanges of the horizontal girders. The gate end frames were assembled in

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the field. The skin plate was installed in five vertical sections and joined by full penetration welds.

Cable attachment brackets are mounted on the skin plate at the bottom corners. The skin plate, purlins, horizontal girders and cable attachment brackets are A441 high strength / low alloy steel (Carbon - Magnesium - Vanadium, Heat Treated for Pressure Vessels). All other members are A-36 steel.

Each trunnion has a 24-inch diameter forged steel pin with a cast aluminum bronze bushing. The trunnion pin was designed to limit the bearing pressure to 4 ksi based on the reaction from the gate of 3,005 kips.

The trunnions rest on a concrete girder that is anchored to the spillway piers with two groups of 48 - 1-1/4 inch diameter prestressed bars. The trunnion girder and anchor bars were designed for two loading conditions: balanced and unbalanced. In the balanced condition with two adjacent gates closed, the total load on each group of anchor bars is 3,040 kips. When one gate is unloaded, the load on the anchor bars increases to 4,180 kips. The bars were designed for 0.6 of ultimate and a total prestress force of 5,122 kips.

The gates are raised and lowered by electric hoist units mounted on the deck above the gates. Eight, 1-inch diameter wire ropes on each side of the gate wind on separate drums mounted on a common shaft. The hoist operating speed is approximately 1.16 feet per minute.

The gates have rubber J-bulb side seals and rubber wedge bottom seals. The side seal plates and sill beams are heated to prevent ice formation. The heating system consists of piping embedded below the seal plates through which electrically heated oil is circulated. The seal heaters are manually started and thermostatically controlled when the air temperature drops to 32 degrees F. There are also air bubblers at three elevations on each pier for ice and debris clearing. They are manually operated from the service gallery.

A trunnion friction coefficient of 0.3 was used to design the yoke anchorage but there is no indication that trunnion friction was considered in the design of the gate arms.

Gate Operation

The gates may be operated by manual control from stations located near each hoist, but normally the gates are remotely controlled from the powerhouse. All of the hoists can be powered from a diesel generator set.

The spillway is operated to pass the desired discharge with the best hydraulic conditions in the stilling basin. The gates are opened in one-foot increments during the fish passage season from March 1 through December 31 according to the operating sequence in Table 1.

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Gate Number / Gate Stops								Total	Spill
1	2	3	4	5	6	7	8	Stops	(kcfs) ¹

(1) Forebay El. 638

1	0	0	0	0	0	0	1	2	4
1	1	0	0	0	0	1	1	4	8
1	1	1	0	0	1	1	1	6	11
1	1	1	1	1	1	1	1	8	15
1	1	2	1	1	2	1	1	10	19
1	1	2	2	2	2	1	2	13	25
2	1	2	2	2	2	1	2	14	27
2	2	2	2	2	2	2	2	16	31
3	2	2	2	2	2	2	2	17	33
3	2	3	3	2	2	2	3	20	39
3	3	3	3	2	3	2	3	22	43
3	3	3	3	2	3	3	4	24	47
3	3	3	4	3	3	3	4	26	52
4	3	4	4	3	3	3	4	28	56
4	4	4	4	3	3	4	4	30	60
5	5	4	4	3	3	4	4	32	64
5	5	5	4	4	3	4	4	34	68
5	5	5	4	4	4	4	5	36	72
5	6	5	5	4	4	4	5	38	76
5	6	5	5	4	4	5	6	40	80
6	6	5	5	4	5	5	6	42	84
6	6	5	5	5	5	6	6	44	88
7	6	5	5	5	5	6	7	46	92
7	6	5	6	6	5	6	7	48	96
7	6	6	6	6	6	6	7	50	100
7	6	6	7	7	6	6	7	52	104
7	7	6	7	7	7	6	7	54	108
7	7	7	7	7	7	7	7	56	112
8	7	7	7	7	7	7	8	58	116
8	7	8	7	8	7	7	8	60	120
8	7	8	8	8	8	7	8	62	124
8	8	8	8	8	8	8	8	64	128
9	8	8	8	8	8	8	9	66	132
9	8	9	8	9	8	8	9	68	136
9	8	9	9	9	9	8	9	70	140

Table 1 - Gate Operating Sequence

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Gate Maintenance

The District performs routine inspections, tests, and lubricates the gates and hoists. Recent significant maintenance activities consist of:

- Gate 1 – In August 1981, placed stoplogs and repaired hoist cable grooves in face plate with Belzona. Gate was sandblasted and painted. Also repaired hoist cable anchors by welding with stainless steel wire. Two 2-inch-diameter by 24-inch-long anodes were installed adjacent to each anchor block. These repairs were inspected in October 1987 and found to be in good condition.
- Gate 5 – Took gate out of service in June 1980 and inspected cables and anchors. Sandblasted damaged areas, repaired by welding, and painted with vinyl system. Inspected repairs in February 1988. South side of gate had severe corrosion under one wire rope with pits up to $\frac{1}{4}$ inch deep.
- Gate 8 – In September 1982 placed stops and repaired cable anchors by welding. Installed magnesium anodes adjacent to each block. Repaired corrosion under the cable with Devcon "A". Sandblasted and painted gate with standard vinyl system. Inspected in May 1992 and found that the repairs were in good condition. The anodes appeared to be preventing corrosion under the wire ropes. The south side shows more corrosion and the wear plates have small pinholes over the full length. The worst corrosion is occurring where the side seals connect to the gate face. The bolts are stainless steel. The center portion of the gate is showing pinhole corrosion.
- In 1983 all gates were reconditioned and repainted under contract DACW68-83-C-0111.

Inspection

General

Wayne Edwards and Mike Haynes of HDR Engineering performed an initial site visit and inspection on April 5, 2000. Based on information collected during the initial inspection, HDR prepared an inspection plan and inspection sheets that were submitted to the District for review prior to the detailed inspection.

The inspection and testing of the spillway radial gates was performed from October 2nd through 9th, by Sam Planck, P.E., Heather Yee and Tony Barela, of HDR Engineering, Inc. Steve Schmidkofer and Jim Knowles of K&N Electric inspected the hoists, took amperage measurements, and recorded observations during testing. Gary Struthers Associates were responsible for operation of the gates during the loaded and unloaded testing and moved the stoplogs between gate testing. Emerald Services, Inc., as a sub-contractor to Gary Struthers, provided water blast cleaning of the skin plate during the upstream face inspection. The weather was clear with temperatures ranging from 50 to 75 degrees F for the inspection of Gates 2

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through 8. The upstream inspection of Gate 1 was performed in rainy conditions and a temperature of 40 to 50 degrees. Due to the wet and unsafe conditions, the racking measurements, inspection of the bottom of the upstream face and the trunnion dial gage measurements were not performed. Sam Planck, P.E. Amy Akins and Marv Brammer, P.E. of HDR returned to the site on November 20th to complete the inspections for Gate 1. The reservoir was full during all of the inspections.

Procedures

Upstream Inspection & Testing

For the upstream inspections, stoplogs were placed in front of the gates prior to the inspection. The upstream face of Gates 1 through 8 were inspected from the spillway deck as each gate was raised to the full open position. The first part of the inspection was a rope access inspection of the bottom seal, bottom of the upstream surface of the skin plate and the hoist connections. At certain gates, the inspection under the bottom of the gate could not be made due to excessive leakage through the stoplogs, see Photo. 1. Racking measurements between the bottom seal and the spillway were also made at this time.



Photo. 1: Heavy leakage from stoplogs preventing inspection of bottom upstream face of Gate 3.

The second part of the upstream inspection consisted of the transverse, operational measurements at the trunnion, amperage readings while opening and closing the gate, and the inspection of the upstream surface of the skin plate. Measurements were made to determine transverse movement of the trunnion hub versus the trunnion yoke at the initial, full open, and final closed position. During the gate opening, visible corrosion, debris and surface inconsistencies were waterblasted from the gate face for better condition assessment, see Photo 2. Amperage readings for the hoist were recorded at initial opening, during opening and during closing.

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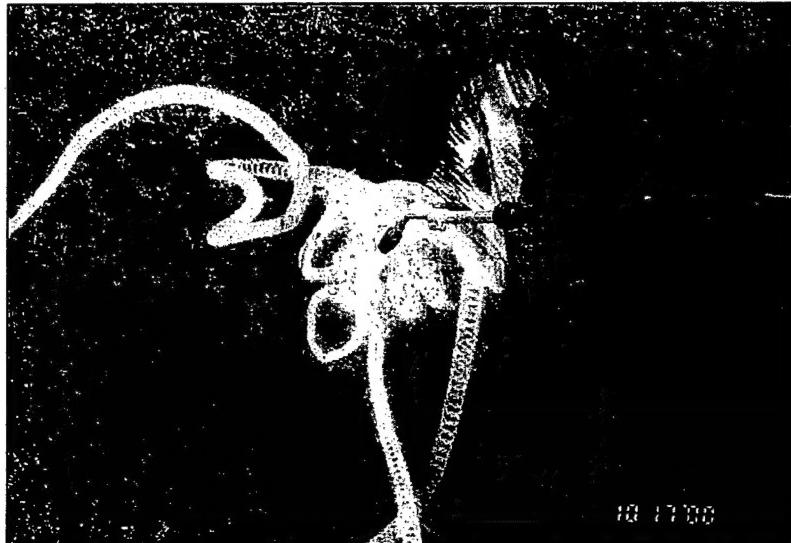


Photo. 2:
*Waterblasting
of upstream
surface of skin
plate during
full opening of
gate.*

Downstream Inspection

The downstream portions of all gates were inspected by climbing along the horizontal girders and radial struts, see Photo. 3. Inspection rigging for the downstream inspections was anchored to the gate hoist equipment and torque tubes. Visual observations were made for excessive sweep and camber of the main struts and were recorded only if an abnormal condition was observed.

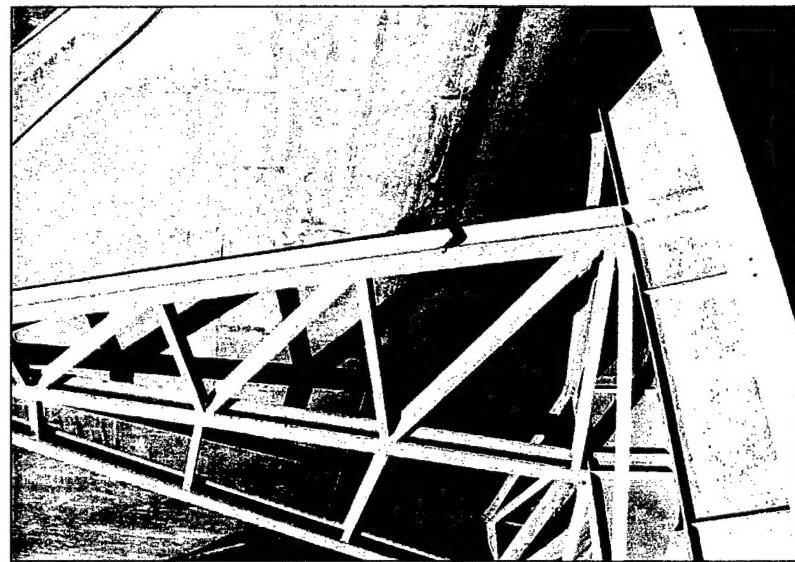


Photo. 3: Rope access downstream inspection.

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Operational Testing – Unloaded vs. Loaded

At the completion of the upstream inspection, with the stoplogs in place and the gate unloaded, dial gages were set at the trunnion to measure the vertical and lateral movement of the trunnion hub versus the trunnion yoke. Steel rulers were used to measure the transverse movement of the trunnion hub versus the trunnion yoke. After initial readings were taken, the top stoplog was cracked open and the void was flooded, loading the gate. When the void between the stoplogs and the gate was completely full, final movement readings were taken. There was no gap present at the bearing between the trunnion yoke and the trunnion support beam, therefore, movement readings between the two surfaces were not made.

Operational Testing – Loaded

With the stoplogs removed and the gate fully loaded, the gates were opened to two feet. Amperage reading for the hoists were recorded at the initial opening, during the opening of the gate and during closing.

Ultrasonic Testing

Non-destructive, ultrasonic testing was not performed at Little Goose Dam. At Lower Granite Dam the locations of field weld splices were indicated on the plans and were ultrasonically tested during the inspection. There were no indications of field weld splices in primary members on the design or shop plans for Little Goose Dam and none were found in the field.

Nomenclature

The gates are identified as Gate 1 to 8, with 1 on the south end near the powerhouse looking downstream. Unless noted otherwise, all locations of observations, and notes pertaining to the radial gates are identified as right or left looking downstream.

In the inspection sheets and this report, corrosion is classified as light, moderate or heavy as follows:

- Light - Surface rust with no flaking or packing. Rust can not be scraped off by hand.
- Moderate - Some flaking, beginning to pack, but thickness of the pack is less than approximately 1/16". There is no observable loss of section.
- Heavy – Pack rust with measurable or observable section loss to the member.

Member Designations

For the radial gate inspection observations and the photographs, the member designations indicated in Figure 1 apply.

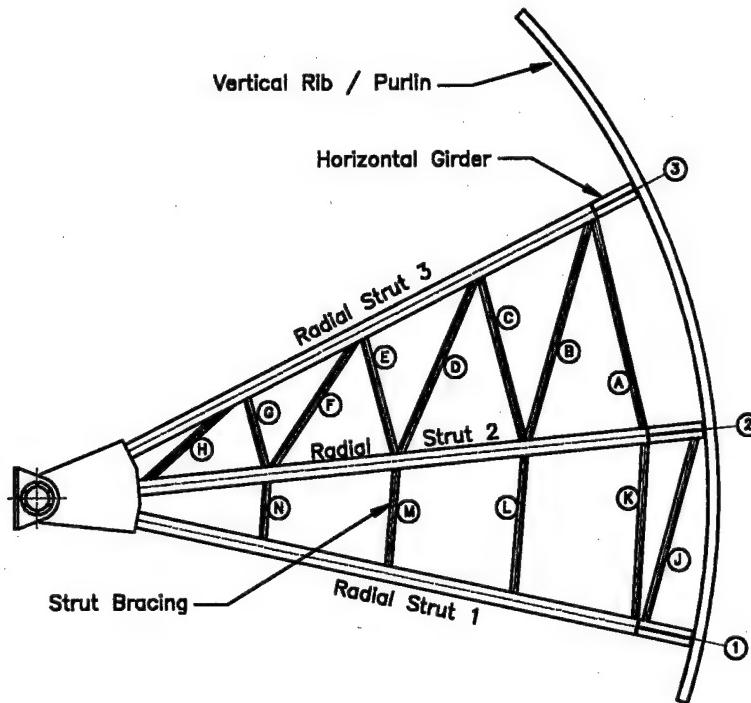


Figure 1: Radial gate member designations.

General Inspection Observations

The majority of condition observations found during the inspection are consistently found at all of the gates. The following section of the report pertains to those general observations or conditions which were found to apply to all of the gates. Specific observations or deficiencies for individual gates begin on page 25. No significant deviations from the as-built plans were observed for the radial gates. Field inspection sheets for the gates are included in Appendix A. Hoist operation and inspection sheets can be found in Appendix B.

Upstream Surface of Skin Plate

The condition of the upstream surface of the skin plate varies from generally good to extremely poor depending on the gate and the locations on the skin plate. On average, the pits are approximately one inch in diameter and 1/4-inch to 5/16-inch deep. Some appear to be greater than 1/4-inch deep in the 3/8-inch thick portion of the skin plate and greater than 3/8-inch deep in

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the 1/2-inch thick portion. See Figure 2, and photos 4 and 5. There is moderate to heavy, scattered pitting on the 3/4-inch wear plates on most of the gates. There is pitting present in excess of 1/2-inch deep at some locations, see Photo. 6. At many locations the pitting on both the skin plate and wear plates appears to be associated with scratches or dings in the plates original protective coating, see Photo. 5 and Photo 7. Based on the hemispherical shape of the pitting, the corrosion appears to be microbially influenced. It is likely that increased acid levels due to microbial activity have created a concentration cell within the pits and accelerated the corrosion.

There is significant delamination of the vinyl coating on the wear plate at Gates 2 and 6 with smaller spots of delamination at other gates. See Photo. 8.

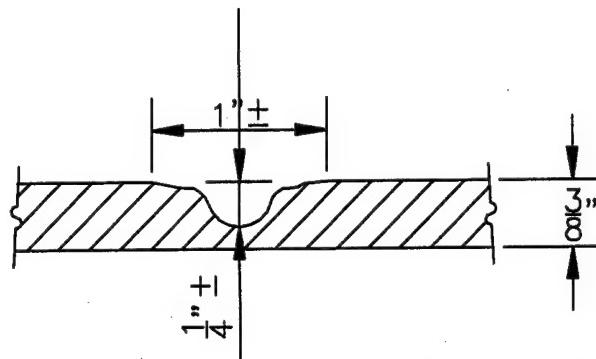


Figure 2: Typical pitting profile in 3/8 inch plate.



Photo. 4: Typical, generally good condition of skin plate.

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Photo. 5: Skin plate pitting, typical.

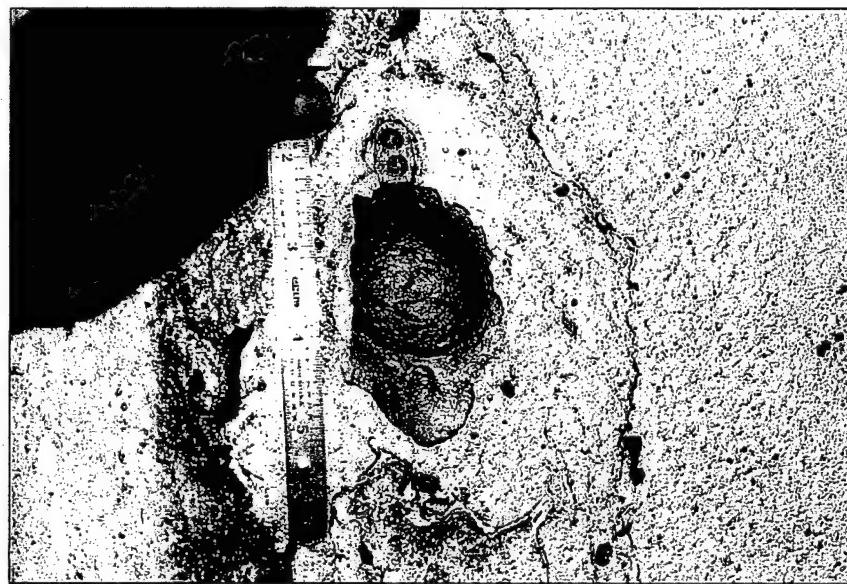


Photo. 6: Wear plate pitting - heavy, typical. Hemispherical shape is indication of microbially influenced corrosion.

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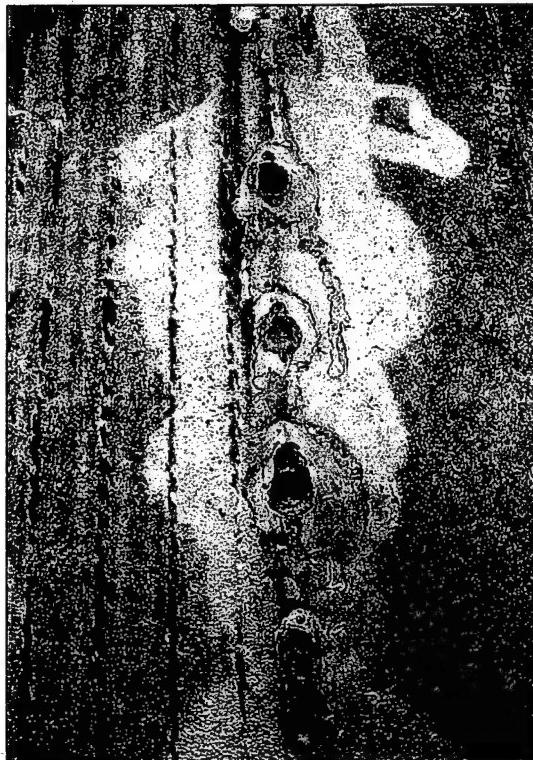


Photo. 7: Pitting on wear plate. Pitting appears to be associated with scratches in coating, typical.



Photo. 8: Delamination of vinyl coating on wear plate, typical Gates 2 and 6.

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Hoists Connections

The hoist connections are in generally good condition with light to moderate corrosion present on the lifting lug plates. The U-bolts, socket blocks and connection pin, which appear to be stainless steel, are in very good condition, see Photo. 9. The design or material type for the U-bolts, socket blocks and connection pin are not listed in the available plans. The sacrificial anodes appear to be in too good of a condition given their installation date of 1981 and 1982. It is likely that they were painted or in some way protected after their installation and ceased functioning as anodes.



Photo. 9: Hoist connection, typical condition.

Downstream Surface of Skin Plate

The downstream surface of the skin plate is in generally good condition. Isolated spots of light to moderate surface corrosion and previous (painted over) pitting can be found at various locations. There is also evidence of previous weld and grind repairs made to some gates indicating earlier penetration of the skin plate by corrosion. The weld and grind repairs are in good condition and show no signs of further corrosion from the downstream side. See Individual Gate Inspection Observations on Page 25 for locations and photographs of weld repairs.

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Vertical Purlins

The vertical purlins are in generally good condition. At the bottom of the gate there is standing water between the bottom seal closure plate, the web of the purlins and the downstream side of the skin plate. Light to moderate corrosion is forming on all surfaces. There is no drainage for this space and it is consistently full of water and debris at all gates, see Figure 3 and Photo. 10.

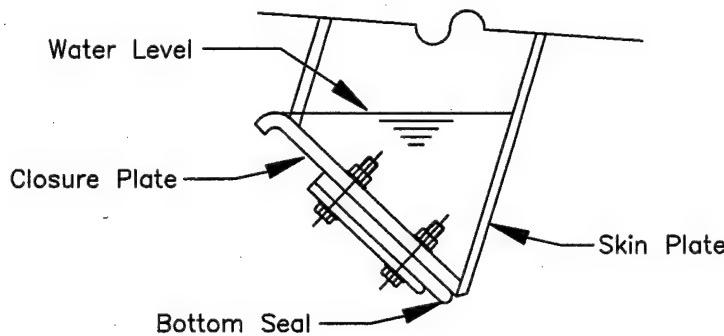


Figure 3: Standing water at bottom of gate between skin plate, purlin webs and bottom seal closure plate, typical.

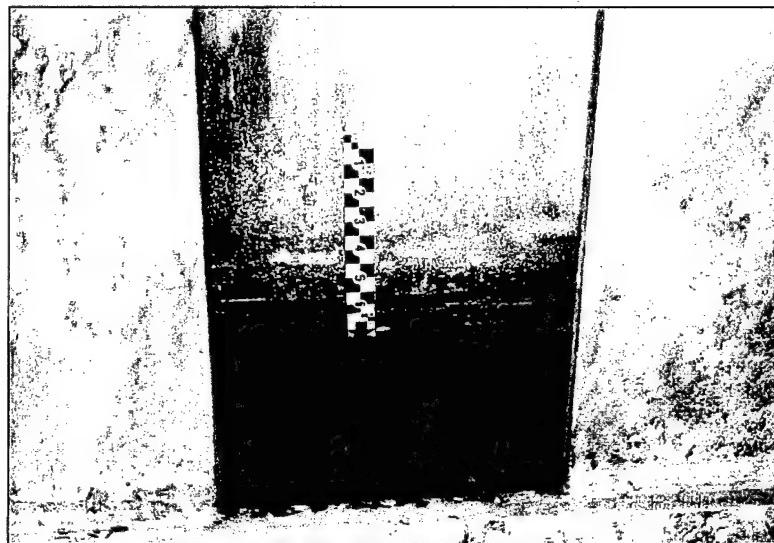


Photo. 10: Standing water at bottom of gate between skin plate, purlin webs and bottom seal closure plate, typical.

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Horizontal Girders and Braces

The horizontal girders and bracing are in generally good condition. There are isolated spots of light to moderate corrosion, mostly at locations with poor drainage.

The top and middle horizontal girders are divided into twelve drainage areas due to the web stiffeners. The area at either end of the girders is free to drain off the end of the web. The remaining ten areas have only three drain holes and require water to flow horizontally through at least one notch in the stiffeners in order to reach a drain hole. There are debris lines and evidence of standing water on nearly all of the horizontal girder flanges and webs.

The worst corrosion occurs on the bottom horizontal girder, between the multiple stiffeners, at each end of the girder. There are six stiffeners in close proximity to one another with drainage only provided horizontally through a notch at the upstream (low) end of the stiffener. In order for the last space to drain, the water must travel horizontally under five stiffeners. These notches are typically clogged and the area between the stiffeners is consistently full of water and debris, see Photo. 11.

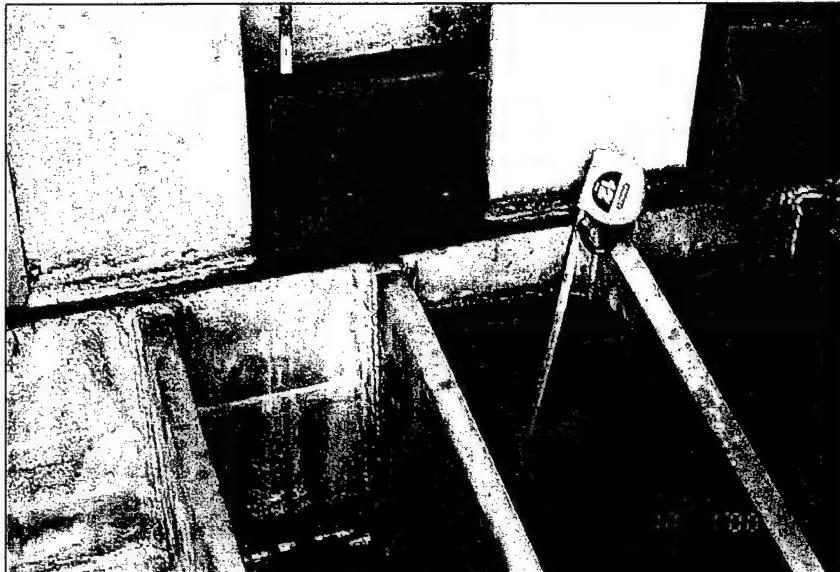


Photo. 11: Standing water between stiffeners at ends of bottom horizontal girder, typical.

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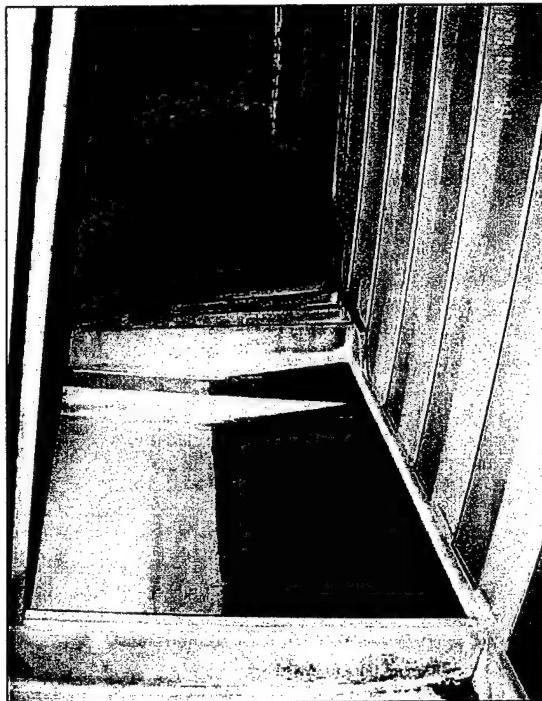


Photo. 12: Standing water or debris lines between stiffeners at ends of bottom horizontal girder, typical.

Immediately upstream and slightly above the end of the bottom horizontal girders, there are stiffeners between the skin plate, purlins and upstream flange of the horizontal girders. There is no drainage from this location and the enclosed area is either full of water and/or debris on all gates. See Photo. 13.

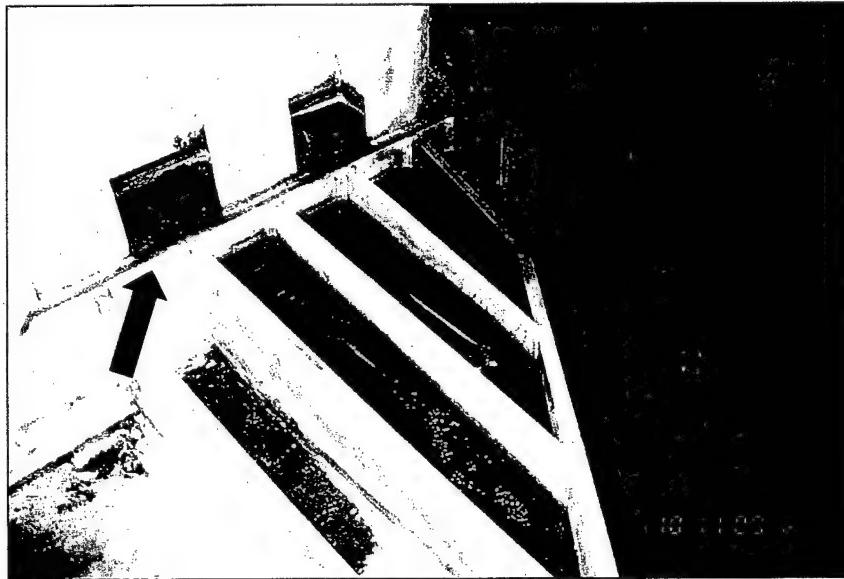


Photo. 13: Standing water and debris between purlins, skin plate and upstream horizontal girder flange, typical.

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On the underside of the bottom horizontal girder, at the connection to the radial struts, there is delaminated paint and light to moderate corrosion around the drain hole in the girder web and near the adjacent stiffeners. See Photo. 14.

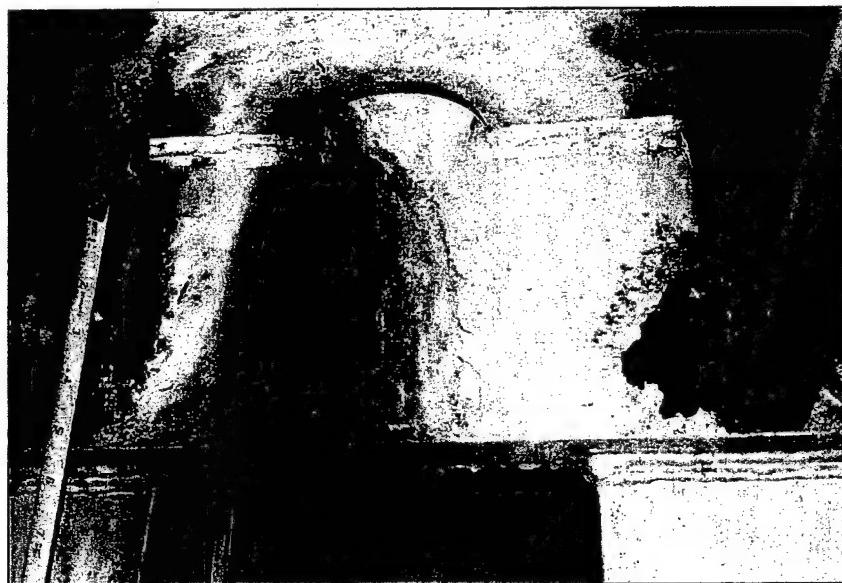


Photo. 14: Corrosion beneath bottom horizontal girder. Looking up at girder flange and drain hole. Stiffener at right, typical.

Radial Struts and Braces

The radial struts are in generally good condition with only light surface corrosion at isolated locations, see Photo 15.

There is very poor drainage from the upstream end of the bottom radial strut and ponding or debris lines (evidence of previous ponding) are found at every gate.

There is very poor drainage from the downstream end of the top radial strut at the trunnion. The three radial struts become an enclosed box section at the trunnion. Since there is no drainage vertically from between the flanges of the top strut, a small drain hole is provided horizontally through the strut flange. The drain hole is consistently clogged and standing water is present at most trunnions. See Photo. 16.

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Photo. 15: Light surface corrosion on radial struts and braces, typical.

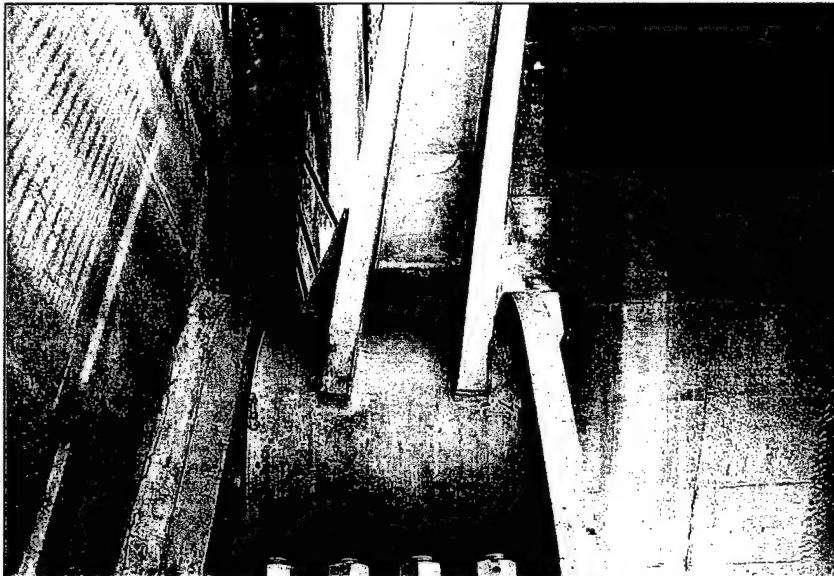


Photo. 16: Standing water at downstream end of top radial strut at trunnion hub, typical.

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Trunnions

The trunnion hubs, yokes and bearing material are in generally very good condition and appear well lubricated. Lubricant was observed being expelled between the yoke and hub, around the circumference of all of the trunnions.

Side and Bottom Seals

The side and bottom seals are in generally good condition. Small side and bottom seal leaks are visible on many of the gates, although no major leaks were observed. There is a leak at the bottom seal, at the spillway monolith construction joint at nearly every gate, see Photo. 17.

There is light to moderate corrosion on the downstream side of the skin plate at the side seals and side seal bolts, see Photo 19.



Photo. 17: Leak at spillway monolith construction joint, typical.

LITTLE GOOSE DAM

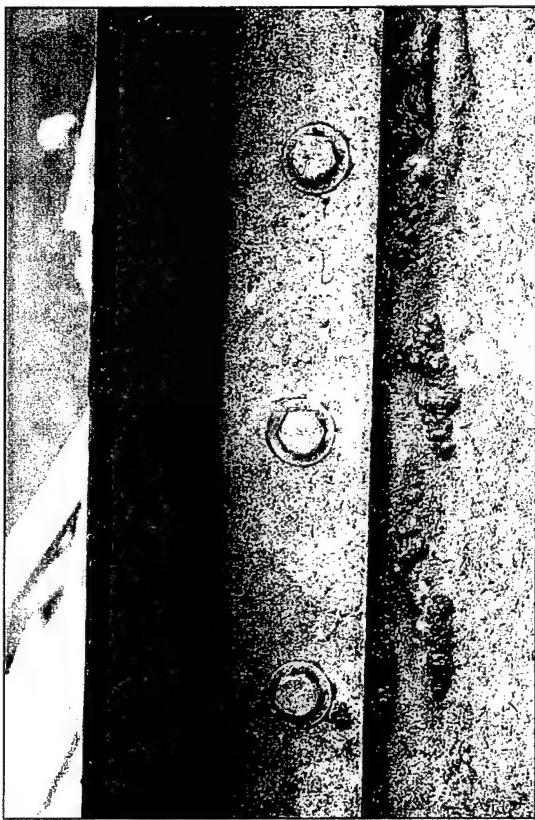


Photo. 19: Side seal from upstream side with no signs of cracking or deterioration, typical condition.



Photo. 18: Side seal from downstream side, light to moderate corrosion on skin plate, seal angles, nuts and bolts, typical condition.

There is moderate corrosion on the skin plate on the upstream side of the bottom seal. The downstream side of the bottom seal is in good condition with little occurrence of corrosion. See Photo. 20 and Photo. 21. The rubber seals are in good condition with only hairline cracking visible.

LITTLE GOOSE DAM



Photo. 20: Upstream side of bottom seal with light to moderate corrosion on skin plate, typical.

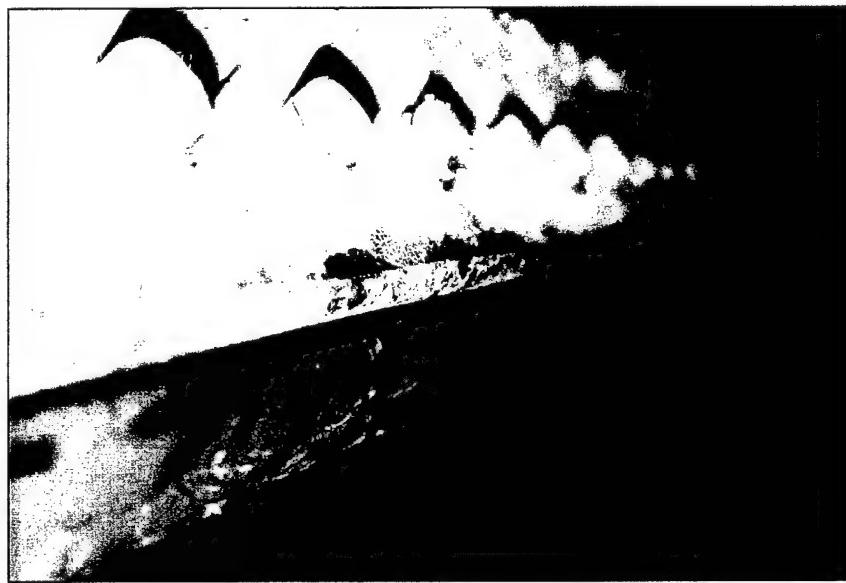


Photo. 21: Downstream side of bottom seal, typical

Radial Gate – Operation, Testing and Measurements

Member Section Dimensions

Section dimensions of main structural members were measured to verify conformance with the design drawings. These members included radial struts, radial strut bracing, horizontal girders, horizontal girder bracing and purlins. Measured dimensions were recorded on field data sheets found in Appendix A. The data sheets also contain nominal section dimensions from the American Institute of Steel Construction (AISC) *Steel Construction Manual, Seventh Edition, 1970*. Section measurements typically include the depth, d (measured at the edges of the flanges), the flange width, b_f , and the flange thickness, t_f . Web thickness, t_w , was only measured if there was an exposed portion of the web or drain holes large enough for calipers.

Differences between the design drawings and the actual field conditions of $1/16^{\text{th}}$ inch or less were deemed to be insignificant. Nearly all members in the field were found to be greater or equal in dimension than what was required in the design drawings. The larger dimensions were probably due to inaccuracies of the field measurements resulting from difficult access or with the thickness of the paint on the members. Those that were smaller were all within the fabrication tolerances. Of those measurements that were out of fabrication tolerance range, none were consistently out of range to conclude that a member other than what was specified in the design drawings was used.

Racking Measurements

Racking measurements for the gates were made at the beginning of the upstream inspection of the gates. Measurements were recorded for the distance between the bottom of the gate at the bottom corner of the bottom seal plate, and the embedded spillway sill plate. Measurements were made as far as possible to the left and right side of the gate depending on stoplog leakage and flow on the spillway. The gates were typically between two and four feet open when the measurements were made. The measurements for racking are as follows:

	Left (inches)	Right (inches)
Gate 1	39 – 1/2	39 – 1/2
Gate 2	39 – 1/2	39 – 1/2
Gate 3	42	42
Gate 4	Too much stoplog leakage to measure	
Gate 5	39 – 1/4	39
Gate 6	41	41
Gate 7	38 – 1/2	39
Gate 8	45	45

Table 1: Gate racking measurements.

LITTLE GOOSE DAM

The gates were also observed at the moment of first opening to look for signs of water release beginning from one side of the gate or the other. In most cases, water release would begin at both sides of the gate simultaneously and move towards the middle of the gate at equal rates. Based on the recorded measurements and observations, there is no apparent racking of the gates.

Trunnion Hub Movement: Closed - Full Open - Closed

With the stoplogs in place, measurements were made of the transverse gap between the trunnion hub and the trunnion yoke, at both sides of the trunnion, at both trunnions. The measurements were made with the gate at the initial opening, full open, and again when closed. The maximum transverse movement recorded between any two positions is as follows:

	Left Trunnion		Right Trunnion	
	Inside (inches)	Pier Side (inches)	Inside (inches)	Pier Side (inches)
Gate 1	1/32	1/32	0	0
Gate 2	0	1/32	0	1/32
Gate 3	0	0	0	0
Gate 4	0	1/32	0	1/32
Gate 5	1/32	1/32	0	0
Gate 6	0	0	1/32	1/32
Gate 7	1/32	2/32	1/32	1/32
Gate 8	1/32	2/32	1/32	0

Table 2: Transverse trunnion hub movement through full opening and closing

Based on the surface irregularities of the trunnion hub and the casting tolerances, the transverse measurements between the hub and the yoke can only be considered accurate to $\pm 1/16$ -inch. The recorded measurements indicate there is no appreciable lateral movement of the trunnion hubs with respect to the trunnion yoke during either opening or closing of the gate.

LITTLE GOOSE DAM

Trunnion Hub Movement: Unloaded vs. Loaded

Dial gages were installed at both trunnion to record the vertical, transverse and upstream / downstream movement of the trunnion hub with respect to the trunnion yoke. The initial measurement was made with the stoplogs in place and no load on the gate. The final reading was made after the top stoplog was removed and the gate was fully loaded. The maximum movements recorded at the trunnion hubs are as follows:

	Vertical (1 / 1000 inch)	Upstream / Downstream (1 / 1000 inch)	Transverse (1 / 1000 inch)
Gate 1	7	34	0
Gate 2	4	22	0
Gate 3	12	31	31
Gate 4	8	32	0
Gate 5	10	31	31
Gate 6	0	45	0
Gate 7	11	37	31
Gate 8	1	30	0

Table 3: Loaded versus unloaded trunnion movements

For the vertical movements shown in Table 4, the hub moved upward with respect to the yoke during loading. The upstream / downstream movement of the hub was in the downstream direction and the transverse movement was outward, toward the piers.

The design tolerance for the 24-inch diameter trunnion pin is listed in the plans as +0.000 inches and -0.005 inches. The tolerances for the 24-inch diameter trunnion bushing is listed as +0.012 inches and -0.000 inches. The shop plans for the pin indicate the pin should be 23.98 inches in diameter with tolerances of +0.000 inches and -0.008 inches.

Based on the recorded movements and the tolerances, there is no significant displacements of the trunnion hub with respect to the trunnion yoke occurring during the loading process.

Individual Gate Inspection Observations

The observations in the following section pertain only to the gates indicated and were not typically found on all of the gates.

Gate 1

- There is an apparent weld and grind repair on the downstream side on the skin plate at approximately 5 feet above the middle horizontal girder near the left side of the gate.

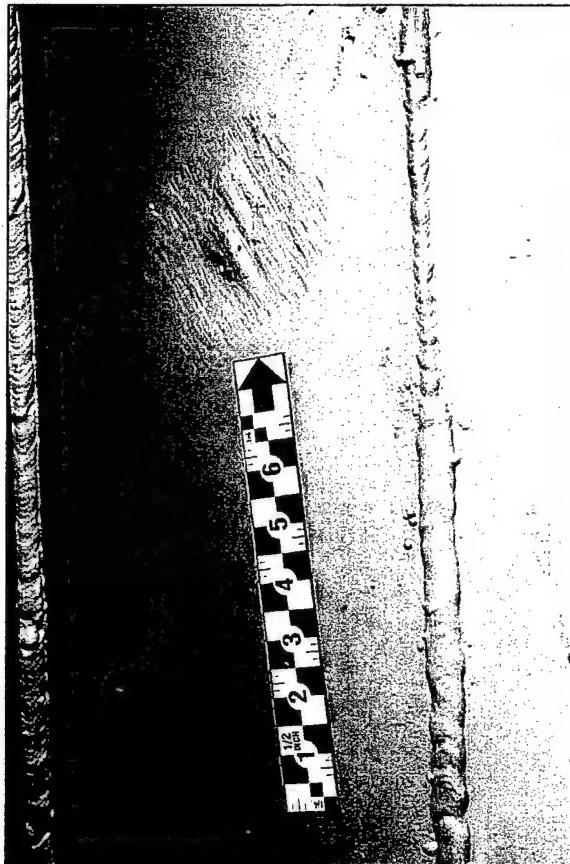


Photo. 22: Apparent previous weld and grind repair as seen from downstream side of skin plate on Gate 1.

LITTLE GOOSE DAM

Gate 2

- On the downstream side of the skin plate, along the wear plate, there is delamination of the vinyl coating on the plate. Large sheets of vinyl are peeling off of the wear plate and hanging loosely on the gate face.



Photo. 23: Delaminated vinyl coating on wear plate, right side of Gate 2.

Gate 3

- See General Inspection Observations

LITTLE GOOSE DAM

Gate 4

- There is a large deformation in the web of the top horizontal girder at the left end.



Photo. 24: Deformation in web of top horizontal girder.

LITTLE GOOSE DAM

Gate 5

- There is a line of light to moderate corrosion on the downstream side of the skin plate just above the top horizontal girder approximately 10 feet from the left side of the gate.

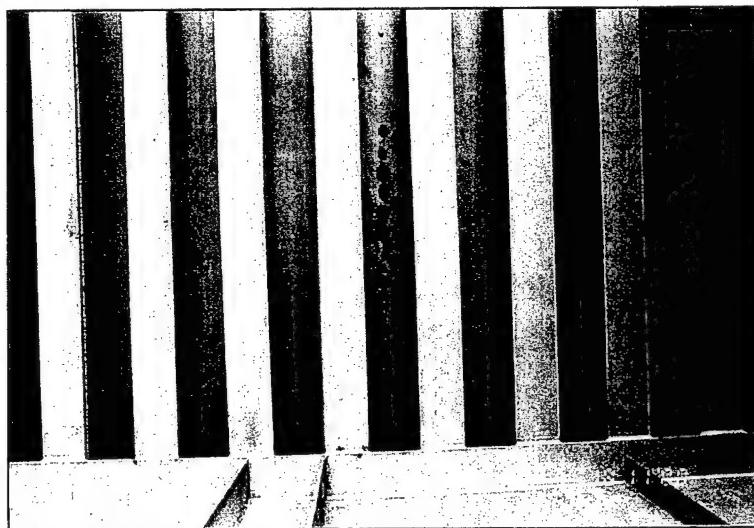


Photo. 25: Moderate corrosion on downstream surface of skin plate.



Photo. 26: Moderate surface corrosion on downstream surface of skin plate.

LITTLE GOOSE DAM

Gate 6

- On the downstream side of the skin plate at approximately half way between the middle and top horizontal girder, twelve feet from the left side, there is an apparent weld and grind repair from a previous leak. The plug weld is approximately $\frac{1}{2}$ -inch in diameter.

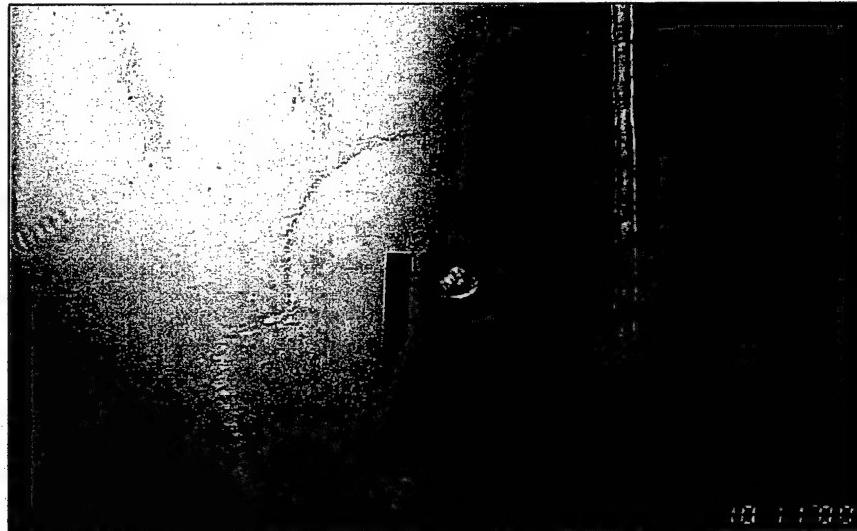


Photo. 27: Apparent, previous weld and grind repair on downstream surface of skin plate.

- On the downstream side of the skin plate, along the wear plate, there is delamination of the vinyl coating on the plate. Large sheets of vinyl are peeling off of the wear plate and hanging loosely on the gate face.



Photo. 28: Delaminated vinyl coating on wear plate, left side of Gate 6.

LITTLE GOOSE DAM

Gate 7

- See General Inspection Observations

Gate 8

- See General Inspection Observations

Hoists – Operation, Testing and Measurements

Hoist Operation Inspection

External portions of the hoist equipment, support platforms and gate connections were visually inspected for signs of excessive corrosion, wear or damage. The hoist and hoist machinery are in generally good condition, however, excessive motor and bearing noises were observed at many of the hoists. See Photos 30, 31 and 32.



Photo. 29: Recording hoist amperage readings.

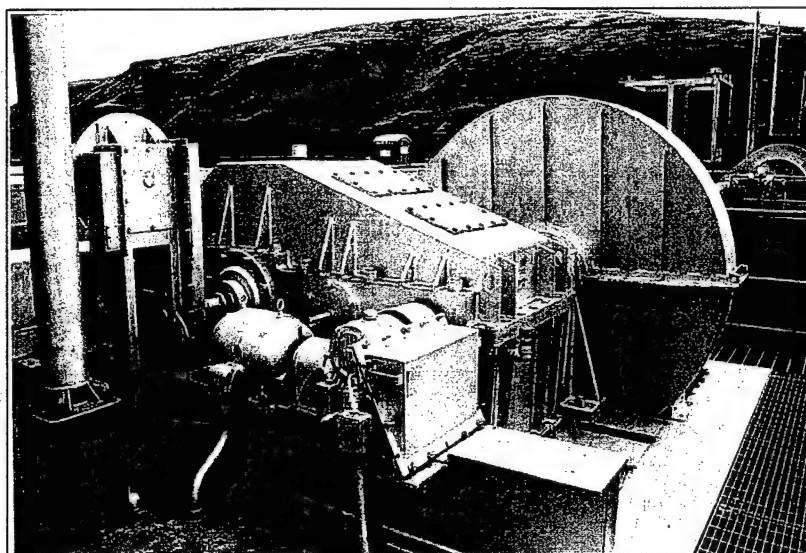


Photo. 30: Gate hoist, typical.

LITTLE GOOSE DAM

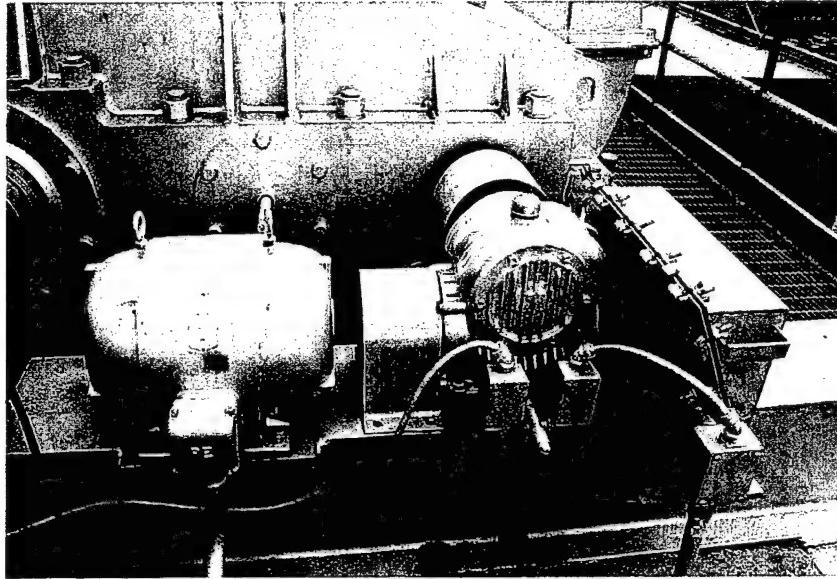


Photo. 31: Hoist motors, typical. Note fluid leaking from beneath motor.



Photo. 32: Hoist manufacturer's plate.

LITTLE GOOSE DAM

The following observations were made at individual gate hoists:

	Hoist and Motor Observations
Gate 1	None
Gate 2	The motor bearings are noisy.
Gate 3	The motor lead wires and heater wires are frayed.
Gate 4	The motor bearings are noisy and sound dry.
Gate 5	None
Gate 6	The hoist brake seized during operation and was adjusted.
Gate 7	The motor bearings are in need of replacement.
Gate 8	None

Table 4: Hoist operation observations.

Hoist Amperage Measurements:

Hoist amperage readings were recorded during opening and closing of the gates in both the loaded and unloaded condition. The readings include the start up and running amperage.

Running amperages were recorded for Phase A, B and C. Table 5 lists the opening and closing start up amperage and the average of the three phases for the running amperage for the gates in the unloaded condition. Table 6 lists the same information for the loaded condition.

	Start up Opening	Start up Closing	Running Opening	Running Closing
Gate 1	87.6	72.0	10.8	6.5
Gate 2	92.8	81.6	10.8	6.6
Gate 3	96.0	85.6	10.9	6.2
Gate 4	94.4	84.0	11.3	5.5
Gate 5	84.8	78.0	11.6	6.2
Gate 6	99.2	80.0	13.4	6.5
Gate 7	102.0	80.0	11.7	6.1
Gate 8	84.0	74.0	12.1	6.3

Table 5: Unloaded Gate - Hoist Amperage Readings

LITTLE GOOSE DAM

	Start up Opening	Start up Closing	Running Opening	Running Closing
Gate 1	112.0	110.0	16.0	9.6
Gate 2	103.0	93.6	12.0	6.8
Gate 3	101.0	94.0	11.6	6.4
Gate 4	96.0	75.0	11.7	5.8
Gate 5	93.0	88.0	12.4	6.1
Gate 6	104.0	99.2	13.6	7.5
Gate 7	101.5	86.0	10.9	6.4
Gate 8	102.0	80.0	11.5	6.1

Table 6: Loaded Gate - Hoist Amperage Readings

Based on the consistency of the readings the hoists are in generally good condition. The amperage data indicates that the tainter gate hoist motors are operating well within their design operating limits that normally allow the starting amperage to be in the range of 5 to 8 times the nameplate value. The current draw for all motors were in acceptable range and the gates appeared to be free with no apparent binding. The motors on the hoists are all noisier than would be expected for these units. The motors all have sealed bearings with no lube ports. During the opening of Gate 6 the hoist motor break seized and adjustments to the break were made in order to continue operation, see Photo. 33. The field inspection sheets for the hoist measurements can be found in Appendix B.

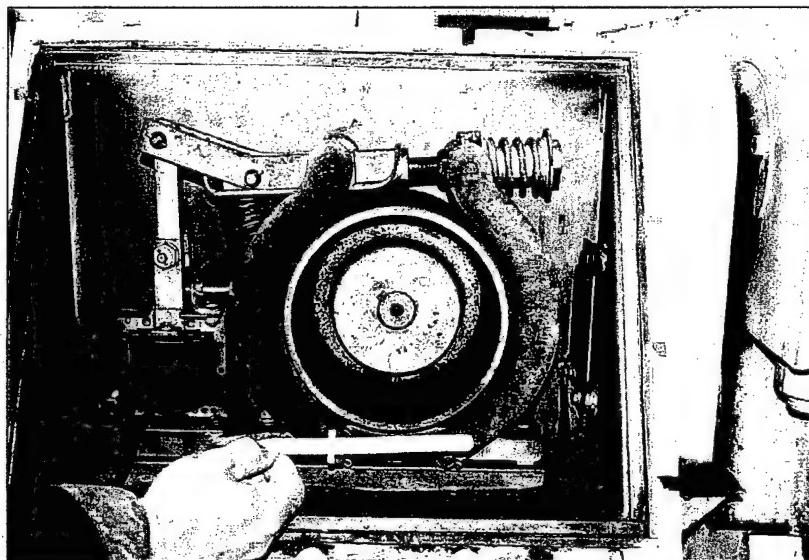


Photo. 33: Seized brake on Gate 6 hoist.

RECOMMENDATIONS

Recommended in the next year or as necessary:

- Repair pitting on skin plate and repaint (or recoat) upstream surface of gate face.
- Install new sacrificial anodes on upstream side of gate. A corrosion expert should be consulted to determine the number and location of anodes required. Existing anodes may remain in place.

These repairs can be undertaken sequentially on all of the gates at once or the repairs could be made on an as-needed basis as the pitting penetrates the skin plate and leaks develop at individual gates.

Recommended in the next 2 years:

- Analyze the hoist gearboxes per the manufacturer's recommendation and remanufacture or replace as required.
- Replace the main gearbox seals on the hoist motors.

Recommended in the next 5 years:

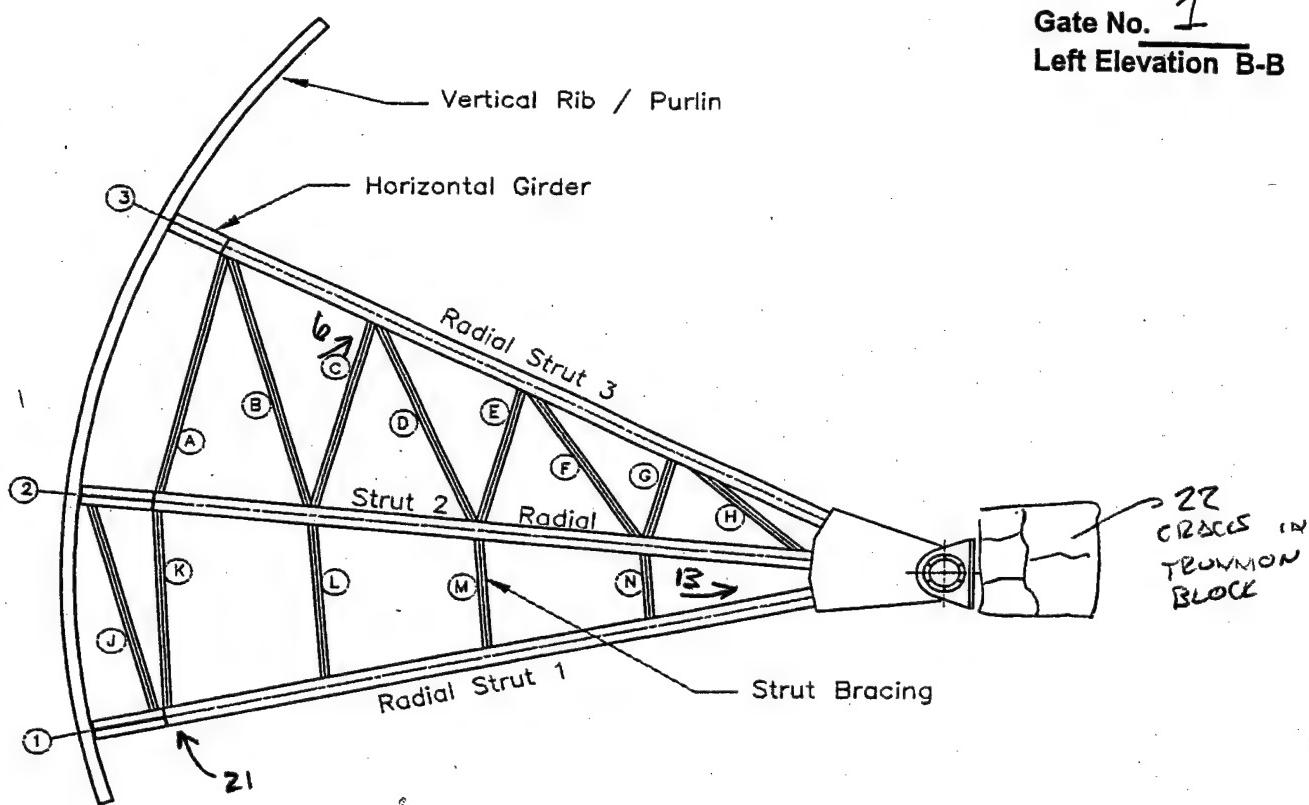
- Install drain hole between the multiple stiffeners at ends of the bottom horizontal girders. The recommended size for these drain holes is 1-inch in diameter.
- Install drain holes in the purlin stiffeners near the ends of the bottom horizontal girders (Plate perpendicular to skin plate, above multiple stiffeners on bottom horizontal girder). The recommended size for these drain holes is 1-inch in diameter.
- Install drain holes in the downstream portion of the bottom seal plate between every purlin. Note: the rubber bottom seal is located between the bottom seal plate and the bottom seal keeper plate. The hole should not be flame cut with the rubber bottom seal in place. The recommended size for these drain holes is 1-inch in diameter.
- Enlarge the drain holes at upstream end of lower radial struts. The recommended size for these drain holes is 1 1/2 - inch in diameter.
- For all new and enlarged drain holes, the holes should be drilled, not flame cut, to reduce jagged edges which snag debris. If drilling holes is not feasible, then the edges of the flame cut holes should be reamed smooth.

LITTLE GOOSE DAM

REFERENCES

1. Water Control Manual, Little Goose Lock and Dam, U.S. Army Corps of Engineers, Walla Walla District, February 1988.

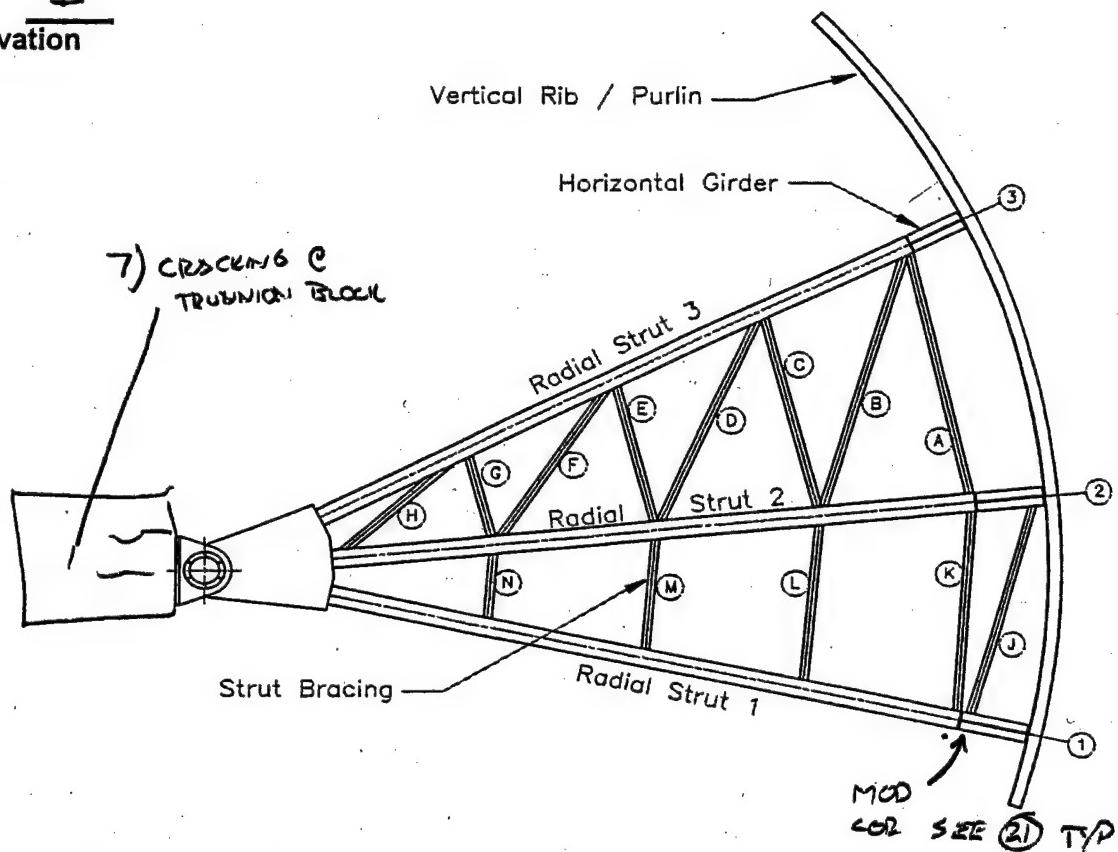
Gate No. 1
Left Elevation B-B



Member	Type	Depth d		Web t_w		Flange(s)			
		Plan (in)	Measured (in)						
Strut 3	14 WF 202	15 5/8	15 3/4	15/16	—	15 3/4	15 3/4	1 1/2	1 1/2
Strut 2	14 WF 342	17 1/2	17 1/2	1 9/16	—	16 3/8	16 3/8	2 7/16	2 1/2
Strut 1	14 WF 398	18 1/4	18 1/4	1 13/16	—	16 5/8	16 5/8	2 13/16	2 3/4
Brace A	14 WF 30	13 7/8	13 7/8	5/16		6 3/4		3/8	
Brace B	14 WF 30	13 7/8	13 7/8	5/16	5/16	6 3/4	6 3/4	3/8	3/8
Brace C	14 WF 30	13 7/8	14	5/16	5/16	6 3/4	6 3/4	3/8	3/8
Brace D	14 WF 30	13 7/8	13 7/8	5/16	5/16	6 3/4	6 3/4	3/8	3/8
Brace E	14 WF 30	13 7/8	13 13/16	5/16	5/16	6 3/4	6 3/4	3/8	3/8
Brace F	14 WF 30	13 7/8	13 7/8	5/16	5/16	6 3/4	6 3/4	3/8	3/8
Brace G	14 WF 30	13 7/8	13 7/8	5/16	5/16	6 3/4	6 3/4	3/8	3/8
Brace H	14 WF 30	13 7/8	14	5/16	5/16	6 3/4	6 3/4	3/8	3/8
Brace J	14 WF 30	13 7/8	13 7/8	5/16	5/16	6 3/4	6 3/4	3/8	3/8
Brace K	14 WF 30	13 7/8	13 7/8	5/16	5/16	6 3/4	6 3/4	3/8	3/8
Brace L	14 WF 30	13 7/8	14	5/16	5/16	6 3/4	6 3/4	3/8	3/8
Brace M	14 WF 30	13 7/8	13 7/8	5/16	5/16	6 3/4	6 3/4	3/8	3/8
Brace N	14 WF 30	13 7/8	13 7/8	5/16	5/16	6 3/4	6 3/4	3/8	3/8

21) MOD COR.

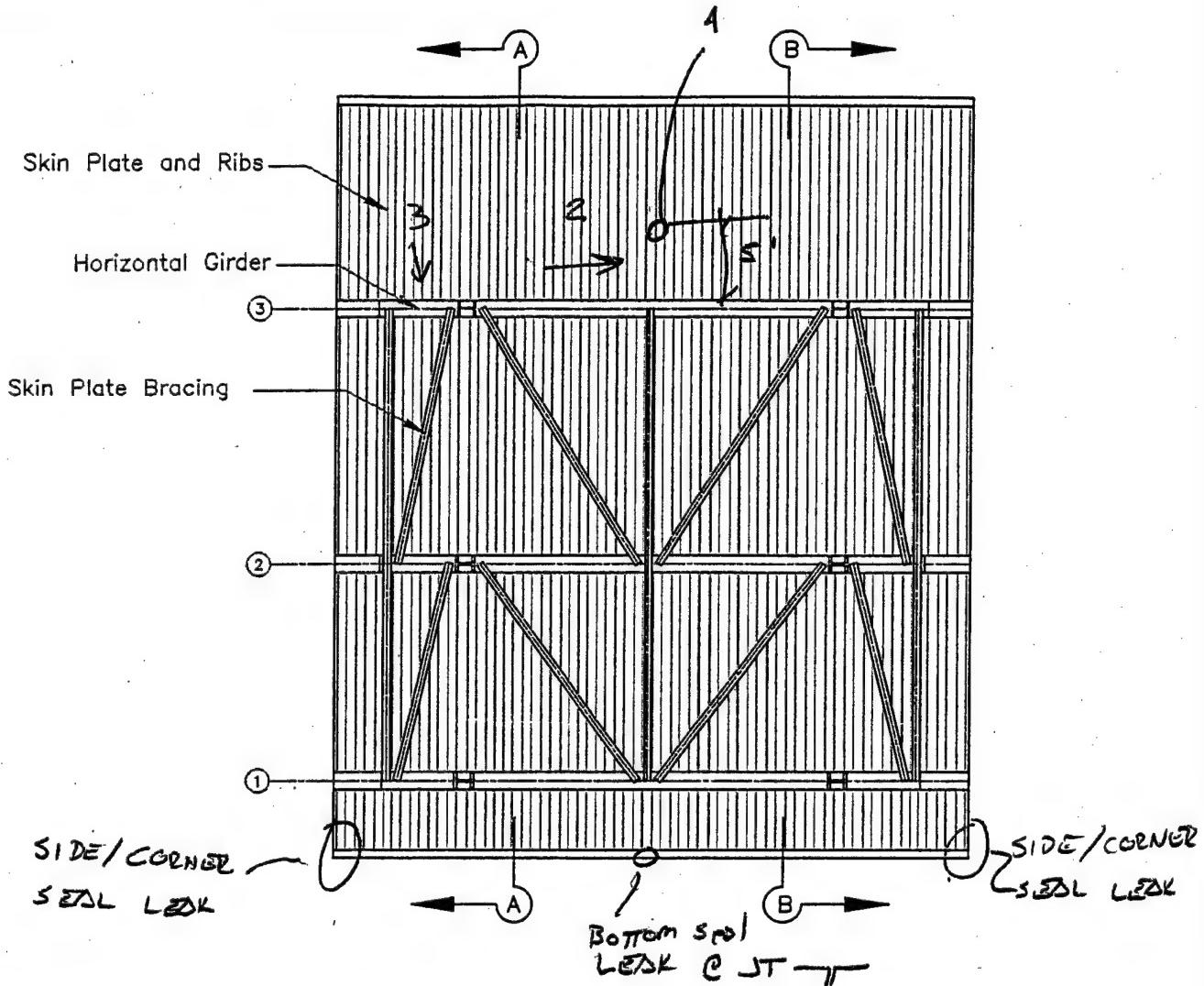
Gate No. 1
Right Elevation
A-A



Member	Type	Depth d		Web t_w		Flange(s)			
		Plan (in)	Measured (in)	Plan (in)	Measured (in)	Plan (in)	Measured (in)	Plan (in)	Measured (in)
Strut 3	14 WF 202	15 5/8	15 5/8	15/16	—	15 3/4	5 3/4	1 1/2	1 1/2
Strut 2	14 WF 342	17 1/2	17 1/2	19/16	—	16 3/8	16 3/8	2 7/16	2 1/2
Strut 1	14 WF 398	18 1/4	18 1/4	113/16	115/16	16 5/8	16 3/8	2 13/16	2 13/16
Brace A	14 WF 30	13 7/8	13 7/8	5/16	5/16	6 3/4	6 3/4	3/8	3/8
Brace B	14 WF 30	13 7/8	13 7/8	5/16	5/16	6 3/4	6 3/4	3/8	3/8
Brace C	14 WF 30	13 7/8	13 7/8	5/16	5/16	6 3/4	6 3/4	3/8	3/8
Brace D	14 WF 30	13 7/8	14	5/16	5/16	6 3/4	6 3/4	3/8	3/8
Brace E	14 WF 30	13 7/8	13 7/8	5/16	5/16	6 3/4	6 3/4	3/8	3/8
Brace F	14 WF 30	13 7/8	13 15/16	5/16	5/16	6 3/4	6 3/4	3/8	3/8
Brace G	14 WF 30	13 7/8	13 7/8	5/16	5/16	6 3/4	6 3/4	3/8	3/8
Brace H	14 WF 30	13 7/8	14	5/16	5/16	6 3/4	6 3/4	3/8	3/8
Brace J	14 WF 30	13 7/8	14	5/16	5/16	6 3/4	6 3/4	3/8	3/8
Brace K	14 WF 30	13 7/8	14	5/16	5/16	6 3/4	6 3/4	3/8	3/8
Brace L	14 WF 30	13 7/8	13 7/8	5/16	5/16	6 3/4	6 3/4	3/8	3/8
Brace M	14 WF 30	13 7/8	13 7/8	5/16	5/16	6 3/4	6 3/4	3/8	3/8
Brace N	14 WF 30	13 7/8	13 7/8	5/16	5/16	6 3/4	6 3/4	3/8	3/8

LEFT FRAME MORE COR THAN RIGHT

Gate No. 1 Downstream Elevation



Member	Type	Depth d		Web t _w		Flange - End			
		Plan (in)	Measured (in)	Plan (in)	Measured (in)	Plan (in)	Measured (in)	Plan (in)	Measured (in)
Horiz. Girder 3	PL Girder	49 3/4	49 7/8	7/16	7/16	16	16	7/8	7/8
Horiz. Girder 2	PL Girder	60 1/2	60 1/2	3/4	13 1/16	16 1/2	16 1/2	1 1/4	1 5/16
Horiz. Girder 1	PL Girder	60 1/2	60 1/2	1	1	16 1/2	16 1/2	1 1/4	1 5/16
Purlins	ST 10 WF 31	10 1/2	10 1/2	13/32	—	8 1/4	8 1/4	5/8	5/8
Skin Plate Bracing	ST 7 WF 15	7	7 1/8	1/4	1/4	6 3/4	6 3/4	3/8	3/8

LIGHT SURFACE COR - EVIDENCE STANDING WATER

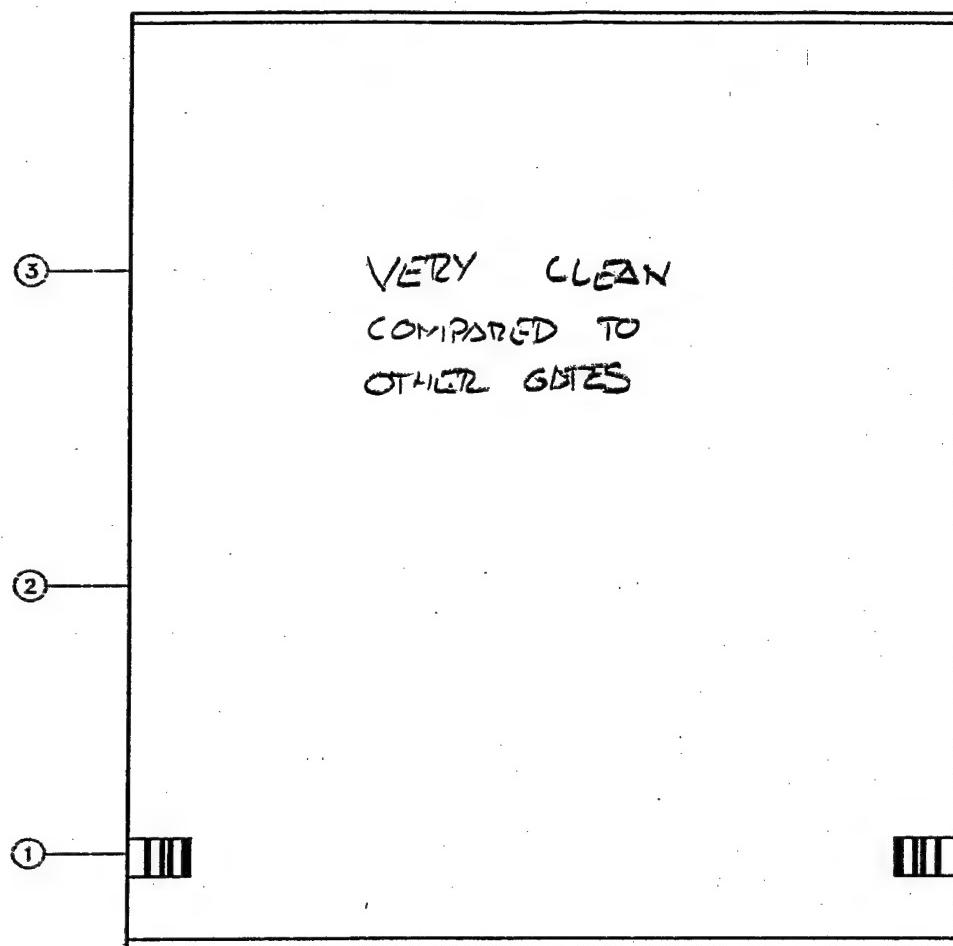
- 2) TYP TOP GIRDERS
- 3) TYP LIGHT CORB
- 4) POSSIBLY PREV. WELD & GRIND PATCH

HDR Engineering, Inc.
Corp of Engineers - Walla Walla
Little Goose Dam

Inspection Team SMP TDB HAY
Weather

Date _____
Sheet 4

Gate No. 1 **Upstream Elevation**



HDR Engineering, Inc.
Corp of Engineers - Walla Walla
Little Goose Dam

Inspection Team SMP TDB HAY AMA
Weather CLOUDY 23°

Date 10/21
Sheet 5

Gate No.

1

Operation and Trunnion Measurements

Racking Measurements: Bottom of Gate and Spillway

LEFT	RIGHT
39 1/4	39 1/4

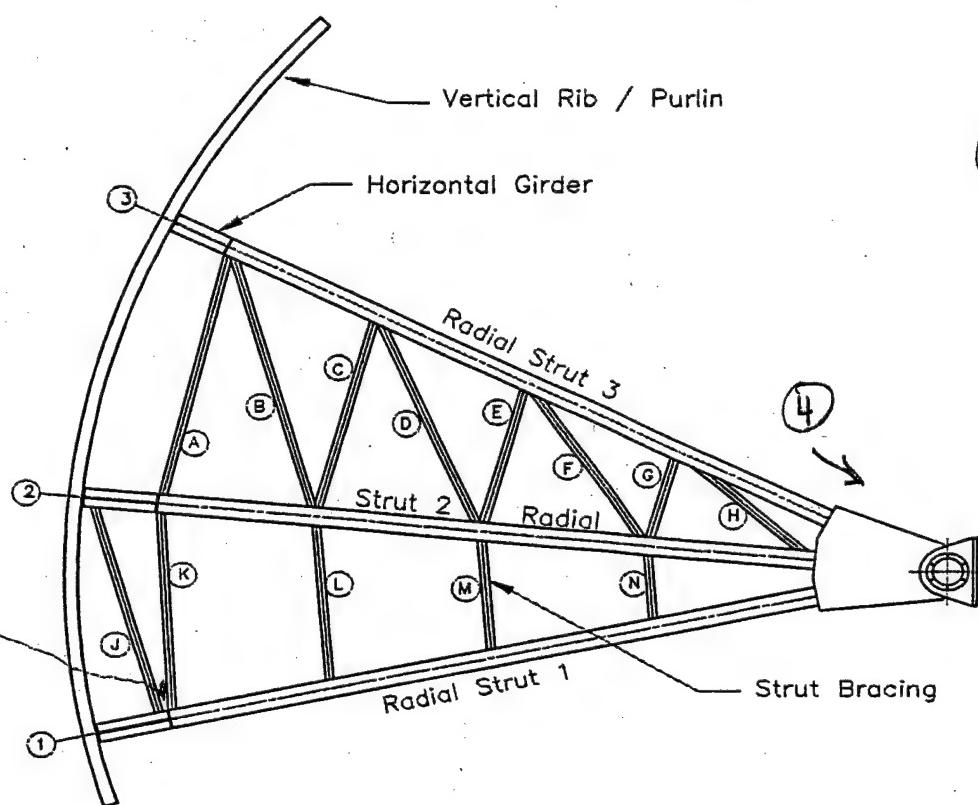
Transverse Trunnion Hub Movement, No Load on Gate: Closed-Open-Closed

LEFT		RIGHT		
	Inside	Outside (pier)	Inside	Outside (pier)
Initial Gate Closed	20/32	14/32	20/32	15/32
Gate Full Open	19/32	15/32	20/32	15/32
Final Gate Closed	20/32	14/32	20/32	15/32

3-D Trunnion Hub Movements - Unloaded vs. Loaded

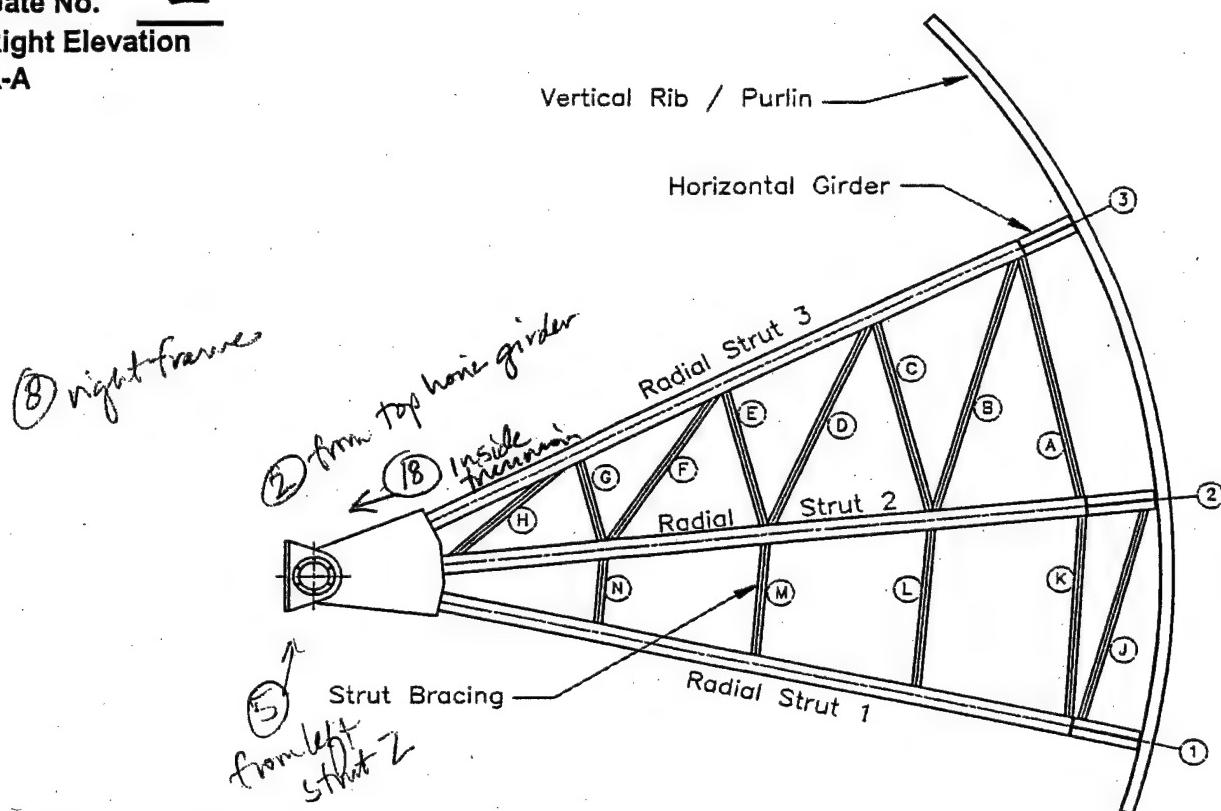
LEFT		RIGHT		
	No Load Void Dry	Full Load Void Full	No Load Void Dry	Full Load Void Full
Vertical	0.0000	-0.0065	0.0000	0.0000
US / DS	0.0000	+0.0335	+0.0065	+0.0365
Transverse	29/32	15/32	29/32	15/32
	Inside	Outside	Inside	Outside

Gate No. 2
Left Elevation B-B



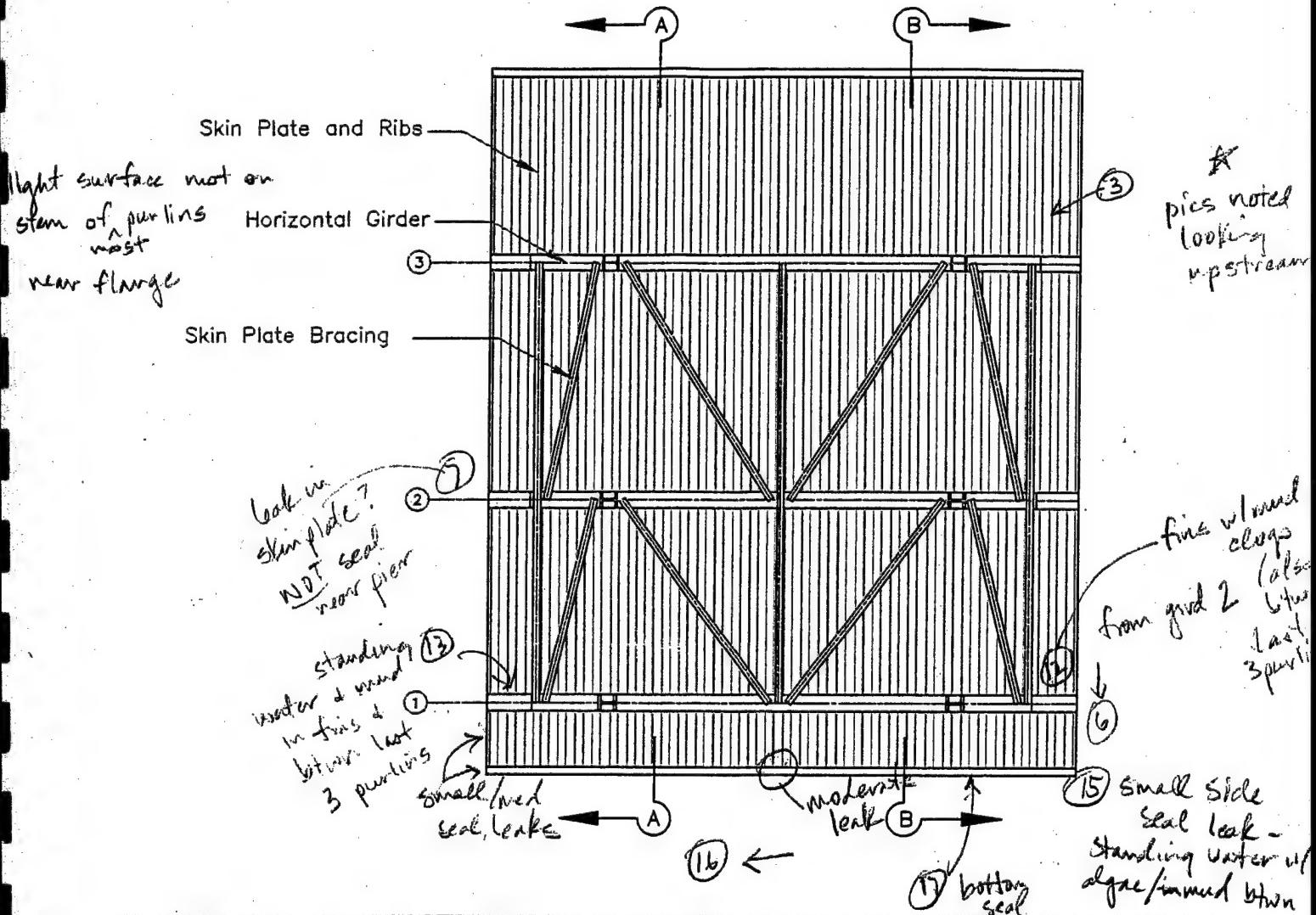
Member	Type	Depth d		Web t_w		Flange(s)			
		Plan (in)	Measured (in)						
Strut 3	14 WF 202	15 5/8	15 5/8	15/16		15 3/4	15 3/4	1 1/2	1 1/2
Strut 2	14 WF 342	17 1/2	17 1/2	1 9/16		16 3/8	16 3/8	2 7/16	2 7/16
Strut 1	14 WF 398	18 1/4	18 5/16	1 13/16	1 3/4	16 5/8	16 1/2	2 13/16	2 3/4
Brace A	14 WF 30	13 7/8	14	5/16		6 3/4	6 7/8	3/8	3/8
Brace B	14 WF 30	13 7/8	14	5/16		6 3/4	6 5/8	3/8	3/8
Brace C	14 WF 30	13 7/8	14	5/16		6 3/4	6 3/4	3/8	3/8
Brace D	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 7/8	3/8	3/8
Brace E	14 WF 30	13 7/8	14	5/16		6 3/4	6 3/4	3/8	3/8
Brace F	14 WF 30	13 7/8	14	5/16		6 3/4	6 7/8	3/8	3/8
Brace G	14 WF 30	13 7/8	14	5/16		6 3/4	6 3/4	3/8	3/8
Brace H	14 WF 30	13 7/8	14	5/16		6 3/4	6 3/4	3/8	3/8
Brace J	14 WF 30	13 7/8	14	5/16		6 3/4	6 7/8	3/8	3/8
Brace K	14 WF 30	13 7/8	14	5/16		6 3/4	6 7/8	3/8	3/8
Brace L	14 WF 30	13 7/8	14	5/16		6 3/4	6 3/4	3/8	3/8
Brace M	14 WF 30	13 7/8	14	5/16		6 3/4	6 3/4	3/8	3/8
Brace N	14 WF 30	13 7/8	14	5/16		6 3/4	6 3/4	3/8	3/8

Gate No. 2
Right Elevation
A-A



Member	Type	Depth d		Web t_w		Flange(s)			
		Plan (in)	Measured (in)	Plan (in)	Measured (in)	Plan (in)	Measured (in)	Plan (in)	Measured (in)
Strut 3	14 WF 202	15 5/8		15/16		15 3/4		1 1/2	
Strut 2	14 WF 342	17 1/2	17 1/2	1 9/16		16 3/8	1 6 3/8	2 7/16	2 7/16
Strut 1	14 WF 398	18 1/4	18 5/8	1 13/16	1 3/4	16 5/8	1 6 1/2	2 13/16	2 13/16
Brace A	14 WF 30	13 7/8	14	5/16		6 3/4	6 3/4	3/8	3/8
Brace B	14 WF 30	13 7/8		5/16		6 3/4		3/8	
Brace C	14 WF 30	13 7/8		5/16		6 3/4		3/8	
Brace D	14 WF 30	13 7/8		5/16		6 3/4		3/8	
Brace E	14 WF 30	13 7/8		5/16		6 3/4		3/8	
Brace F	14 WF 30	13 7/8		5/16		6 3/4		3/8	
Brace G	14 WF 30	13 7/8		5/16		6 3/4		3/8	
Brace H	14 WF 30	13 7/8		5/16		6 3/4		3/8	
Brace J	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 3/4	3/8	3/8
Brace K	14 WF 30	13 7/8	14	5/16		6 3/4	6 3/4	3/8	3/8
Brace L	14 WF 30	13 7/8	14	5/16		6 3/4	6 3/4	3/8	3/8
Brace M	14 WF 30	13 7/8	14	5/16		6 3/4	6 3/4	3/8	3/8
Brace N	14 WF 30	13 7/8	14	5/16		6 3/4	6 3/4	3/8	3/8

Gate No. 2 Downstream Elevation

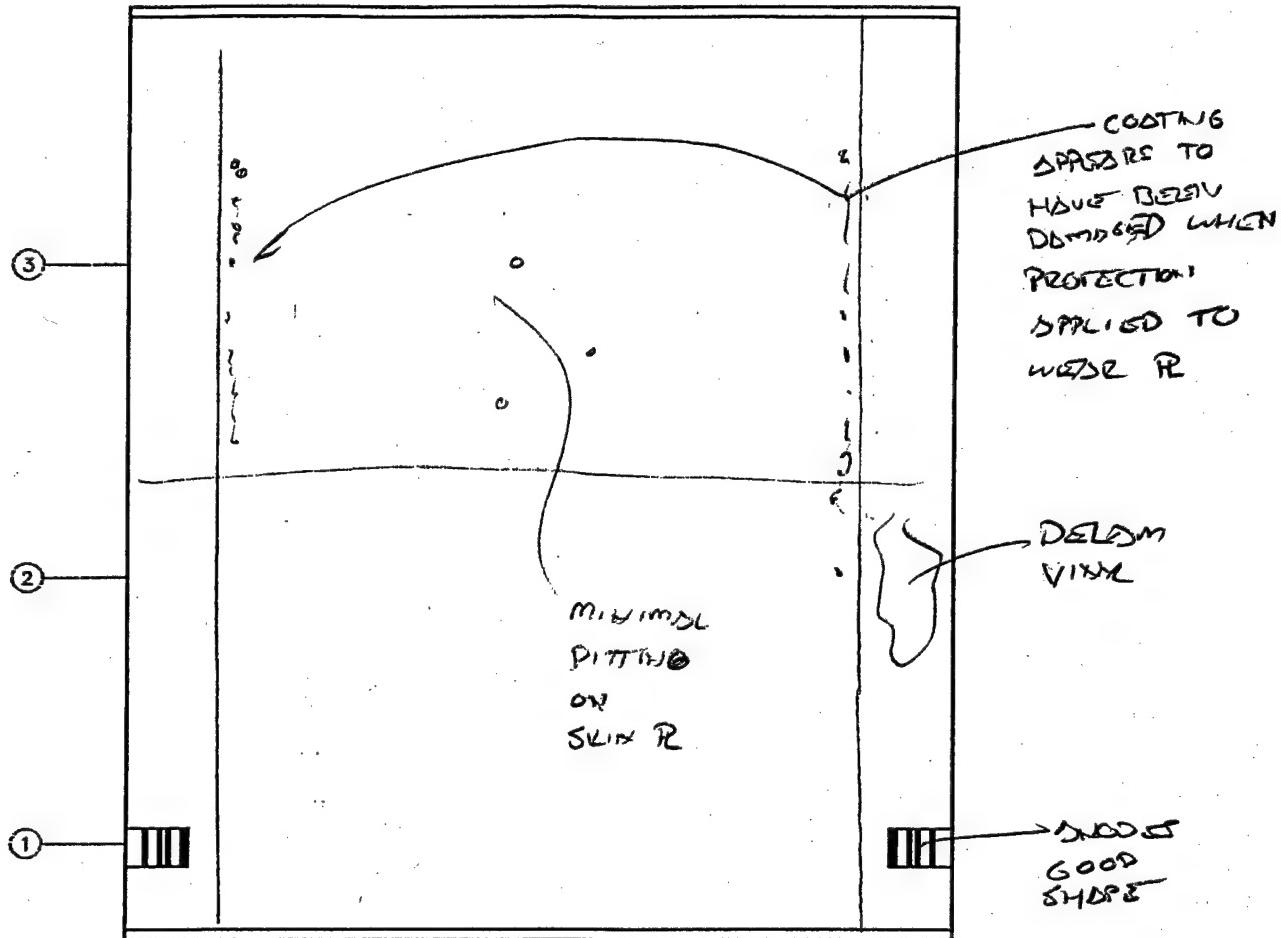


Member	Type	Depth d		Web t_w		Flange - End			
		Plan (in)	Measured (in)	Plan (in)	Measured (in)	Plan (in)	Measured (in)	Plan (in)	Measured (in)
Horiz. Girder 3	PL Girder	49 3/4	50	7/16	7/16	16	16	7/8	30/32
Horiz. Girder 2	PL Girder	60 1/2	60 1/2	3/4	3 1/4	16 1/2	16 1/2	1 1/4	1 1/4
Horiz. Girder 1	PL Girder	60 1/2	60 1/2	1	1	16 1/2	16 1/2	1 1/4	1 1/4
Purlins	ST 10 WF 31	10 1/2	10 1/2	13/32		8 1/4	8 1/4	5/8	9/16
Skin Plate Bracing	ST 7 WF 15	7	7	1/4	5/16	6 3/4	6 7/8	3/8	3/8

Gate No.

2

Upstream Elevation



Gate No.

2

Operation and Trunnion Measurements

Racking Measurements: Bottom of Gate and Spillway

LEFT	RIGHT
39 1/2	39 1/2

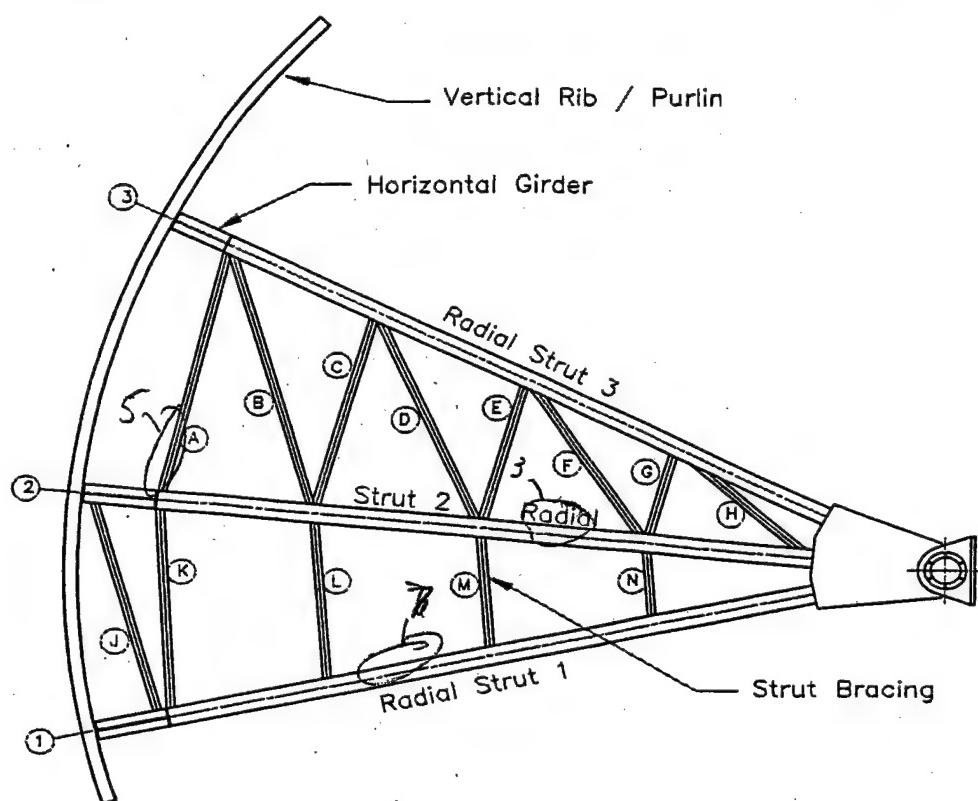
Transverse Trunnion Hub Movement, No Load on Gate: Closed-Open-Closed

	LEFT		RIGHT	
	Inside	Outside (pier)	Inside	Outside (pier)
Initial Gate Closed	22/32	9/32	17/32	21/32
Gate Full Open	22/32	10/32	17/32	21/32
Final Gate Closed	22/32	10/32	17/32	22/32

3-D Trunnion Hub Movements - Unloaded vs. Loaded

	LEFT		RIGHT	
	No Load Void Dry	Full Load Void Full	No Load Void Dry	Full Load Void Full
Vertical	0.0000	+0.0020	-0.0005	-0.0045
US / DS	0.0000	+0.0219	+0.0005	+0.0225
Transverse	22/32	10/32	22/32	10/32
	Inside	Outside	Inside	Outside

Gate No. 3
Left Elevation B-B



Member	Type	Depth d		Web t_w		Flange(s)			
		Plan (in)	Measured (in)	Plan (in)	Measured (in)	Plan (in)	Measured (in)	Plan (in)	Measured (in)
Strut 3	14 WF 202	15 5/8	15 3/4	15/16		15 3/4	15 3/4	1 1/2	1 1/2
Strut 2	14 WF 342	17 1/2	17 7/16	1 9/16		16 3/8	16 3/8	2 7/16	2 7/16
Strut 1	14 WF 398	18 1/4	18 1/4	1 13/16		16 5/8	16 5/8	2 13/16	2 13/16
Brace A	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 3/4	3/8	3/8
Brace B	14 WF 30	13 7/8	14	5/16		6 3/4	6 3/4	3/8	3/8
Brace C	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8
Brace D	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8
Brace E	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8
Brace F	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 3/4	3/8	3/8
Brace G	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8
Brace H	14 WF 30	13 7/8	14 3/16	5/16		6 3/4	6 3/4	3/8	3/8
Brace J	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8
Brace K	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8
Brace L	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8
Brace M	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8
Brace N	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8

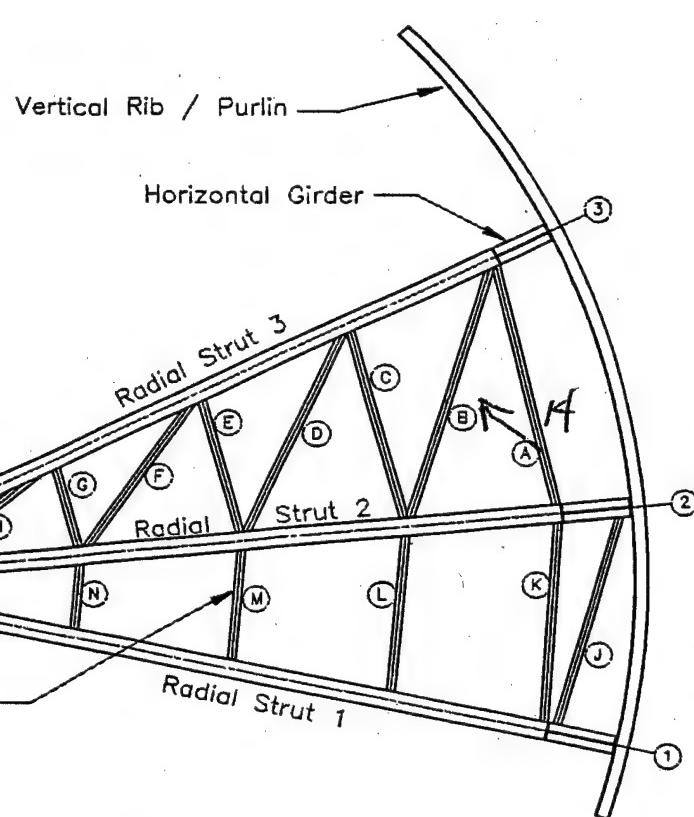
3. Splattered Concrete on 2nd Strut.

4. Overall shot of LFT frame note. CONCRETE SPLATTER and light rust

5. Vert Brace light Rust Typ. All braces

7. Concrete SPLATTER on Bot. Strut

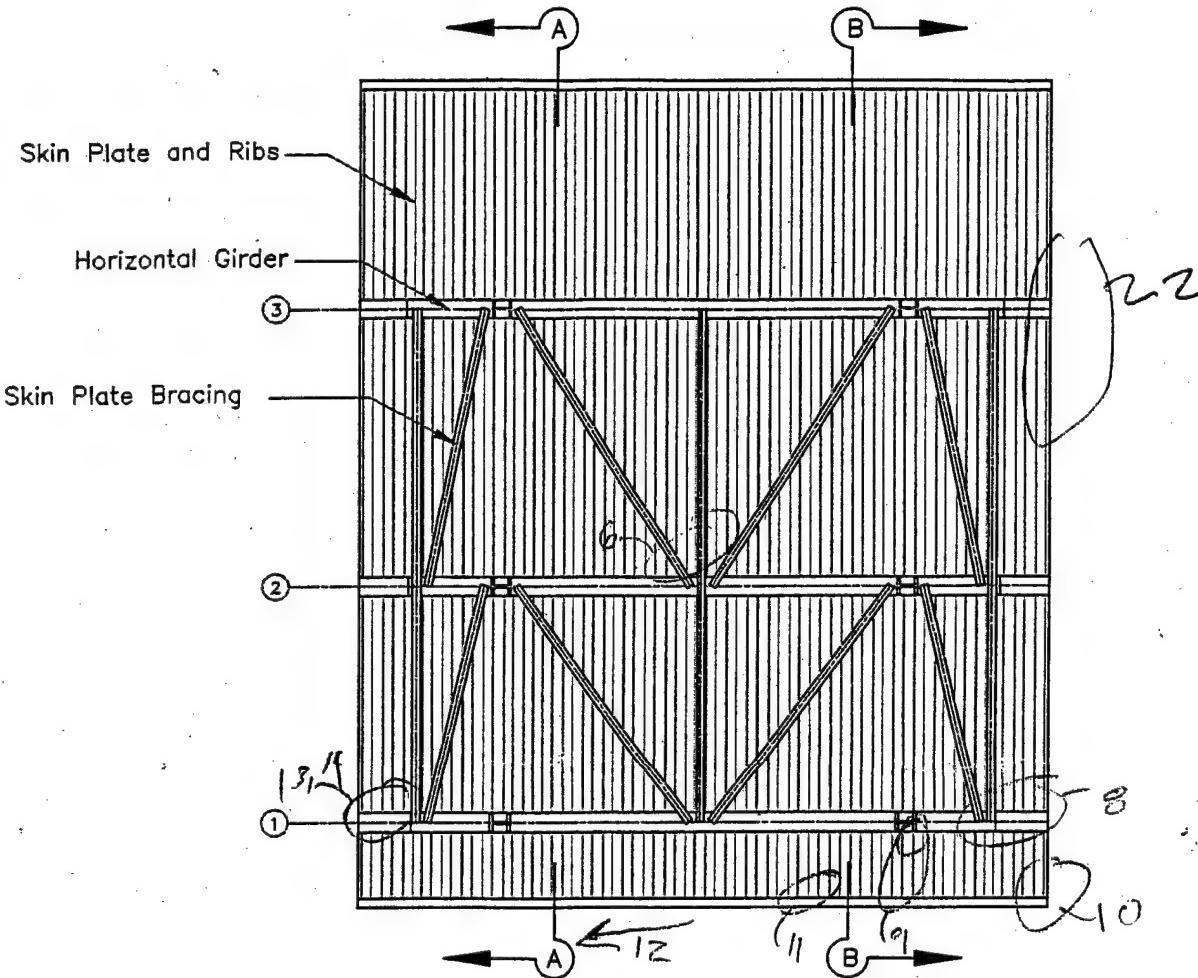
Gate No. 43
Right Elevation
A-A



Member	Type	Depth d		Web t_w		Flange(s)			
		Plan (in)	Measured (in)	Plan (in)	Measured (in)	Plan (in)	Measured (in)	Plan (in)	Measured (in)
Strut 3	14 WF 202	15 5/8	15 13/16	15/16		15 3/4	15 5/8	1 1/2	1 1/2
Strut 2	14 WF 342	17 1/2	17 1/2	19/16		16 3/8	16 1/4	2 7/16	2 7/8
Strut 1	14 WF 398	18 1/4	18 3/16	1 13/16		16 5/8	16 7/16	2 13/16	2 15/16
Brace A	14 WF 30	13 7/8	13	5/16		6 3/4	6 3/4	3/8	3/8
Brace B	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 3/4	3/8	3/8
Brace C	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	16 13/16	3/8	3/8
Brace D	14 WF 30	13 7/8	13 5/16	5/16		6 3/4	16 13/16	3/8	3/8
Brace E	14 WF 30	13 7/8	13 3/4	5/16		6 3/4	16 15/16	3/8	3/8
Brace F	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	16 15/16	3/8	3/8
Brace G	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8
Brace H	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8
Brace J	14 WF 30	13 7/8	14	5/16		6 3/4	6 3/4	3/8	3/8
Brace K	14 WF 30	13 7/8	14	5/16		6 3/4	16 13/16	3/8	3/8
Brace L	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	16 3/4	3/8	3/8
Brace M	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	16 5/8	3/8	3/8
Brace N	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 3/4	3/8	3/8

14. Shot of PRM. NOTE light Rust on most Members

Gate No. 3 Downstream Elevation



Member	Type	Depth d		Web t _w		Flange - End			
		Plan (in)	Measured (in)	Plan (in)	Measured (in)	Plan (in)	Measured (in)	Plan (in)	Measured (in)
Horiz. Girder 3	PL Girder	49 3/4	50	7/16	7 1/4	16	16	7/8	7/8
Horiz. Girder 2	PL Girder	60 1/2	60 7/16	3/4	3 1/4	16 1/2	16 9/16	1 1/4	1 1/4
Horiz. Girder 1	PL Girder	60 1/2	60 1/2	1	1 1/16	16 1/2	16 1/2	1 1/4	1 1/4
Purlins	ST 10 WF 31	10 1/2	10 1/2	13/32	9 1/16	8 1/4	8 5/16	5/8	
Skin Plate Bracing	ST 7 WF 15	7	7	1/4	3 1/16	6 3/4	6 2/19	3/8	3/8

2. LEFT Purlin light Rust w/ Min Deposits

6. Light Rust ON Bracing Typ.

8. Standing H2O on Bot. Girder NOTE light Rust

9. Drain hole w/ Continuous Flow from above

10. Side Seal leak. (LEFT)

11. Standing H2O and stuck @ Bot. Ft.

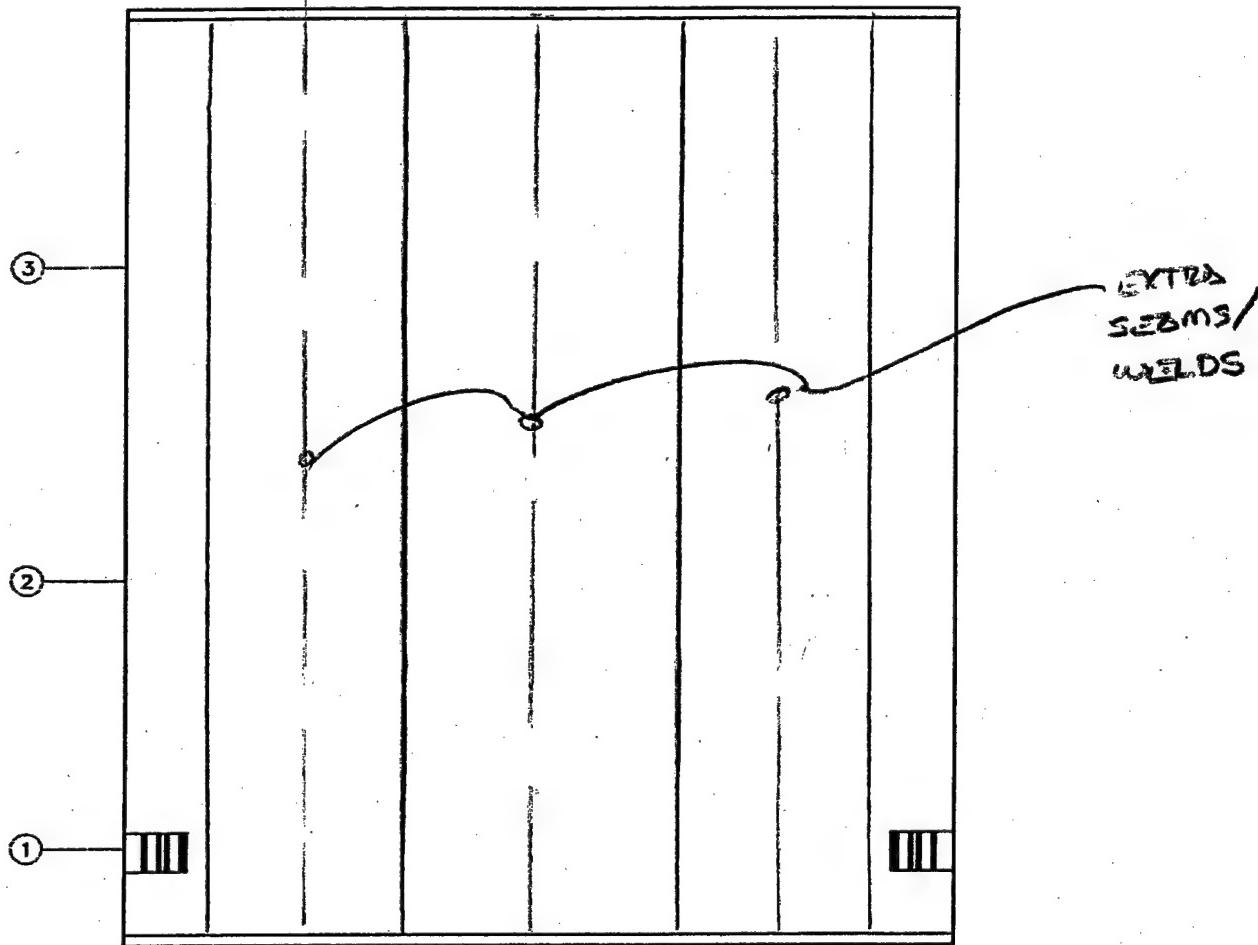
12 looking LT. Along bottom seal

13,14 Moderate to heavy Rust @ Bot Girder @ Braces Mts

Gate No.

3

Upstream Elevation



- VERY LITTLE COR.

- NOT PITS TOP 20'

HDR Engineering, Inc.
Corp of Engineers - Walla Walla
Little Goose Dam

Inspection Team SMP TDB HAY AMA
Weather SUNNY 70

Date 10/19/00
Sheet 5

Gate No. 3

Operation and Trunnion Measurements

Racking Measurements: Bottom of Gate and Spillway

LEFT	RIGHT
42	42

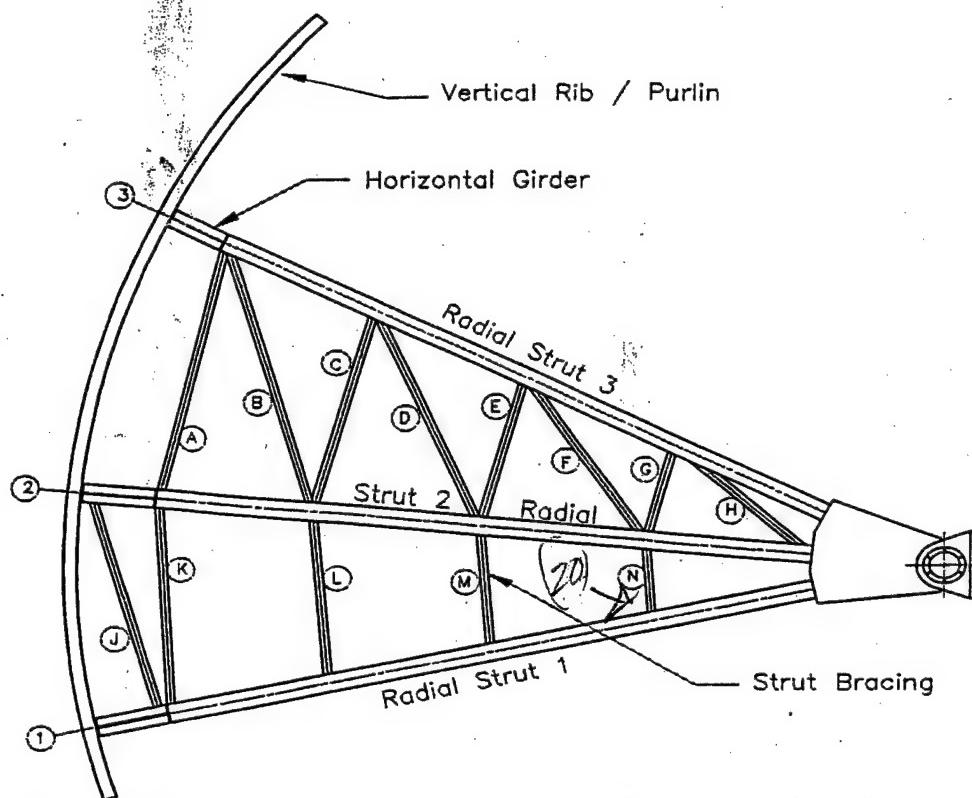
Transverse Trunnion Hub Movement, No Load on Gate: Closed-Open-Closed

LEFT		RIGHT		
	Inside	Outside (pier)	Inside	Outside (pier)
Initial Gate Closed	28/32	18/32	18/32	14/32
Gate Full Open	28/32	18/32	18/32	14/32
Final Gate Closed	28/32	18/32	18/32	14/32

3-D Trunnion Hub Movements - Unloaded vs. Loaded

LEFT		RIGHT		
	No Load Void Dry	Full Load Void Full	No Load Void Dry	Full Load Void Full
Vertical	+0.0005	+0.0070	-0.0010	-0.0130
US / DS	0.0000	+0.0308	-0.0025	+0.0250
Transverse	28/32	18/32	28/32	18/32
	Inside	Outside	Inside	Outside

Gate No. 4
Left Elevation B-B



Member	Type	Depth		Web		Flange(s)			
		Plan (in)	Measured (in)						
Strut 3	14 WF 202	15 5/8	15 1/8	15/16	—	15 3/4	✓	1 1/2	✓
Strut 2	14 WF 342	17 1/2	17 1/2	1 9/16	—	16 3/8	✓	2 7/16	✓
Strut 1	14 WF 398	18 1/4	18 1/4	1 13/16	—	16 5/8	17 1/2	2 13/16	✓
Brace A	14 WF 30	13 7/8	14	5/16	—	6 3/4	✓	3/8	5/16
Brace B	14 WF 30	13 7/8	13 5/16	5/16	—	6 3/4	✓	3/8	5/16
Brace C	14 WF 30	13 7/8	13 5/16	5/16	—	6 3/4	✓	3/8	5/16
Brace D	14 WF 30	13 7/8	13 5/16	5/16	—	6 3/4	✓	3/8	5/16
Brace E	14 WF 30	13 7/8	14	5/16	—	6 3/4	13 1/16	3/8	✓
Brace F	14 WF 30	13 7/8	14	5/16	—	6 3/4	✓	3/8	5/16
Brace G	14 WF 30	13 7/8	✓	5/16	—	6 3/4	13 1/16	3/8	✓
Brace H	14 WF 30	13 7/8	✓	5/16	—	6 3/4	13 1/16	3/8	5/16
Brace J	14 WF 30	13 7/8	14	5/16	—	6 3/4	✓	3/8	1/4
Brace K	14 WF 30	13 7/8	14	5/16	—	6 3/4	✓	3/8	✓
Brace L	14 WF 30	13 7/8	13 3/4	5/16	✓	6 3/4	13 1/16	3/8	✓
Brace M	14 WF 30	13 7/8	14	5/16	—	6 3/4	✓	3/8	✓
Brace N	14 WF 30	13 7/8	14	5/16	—	6 3/4	✓	3/8	✓

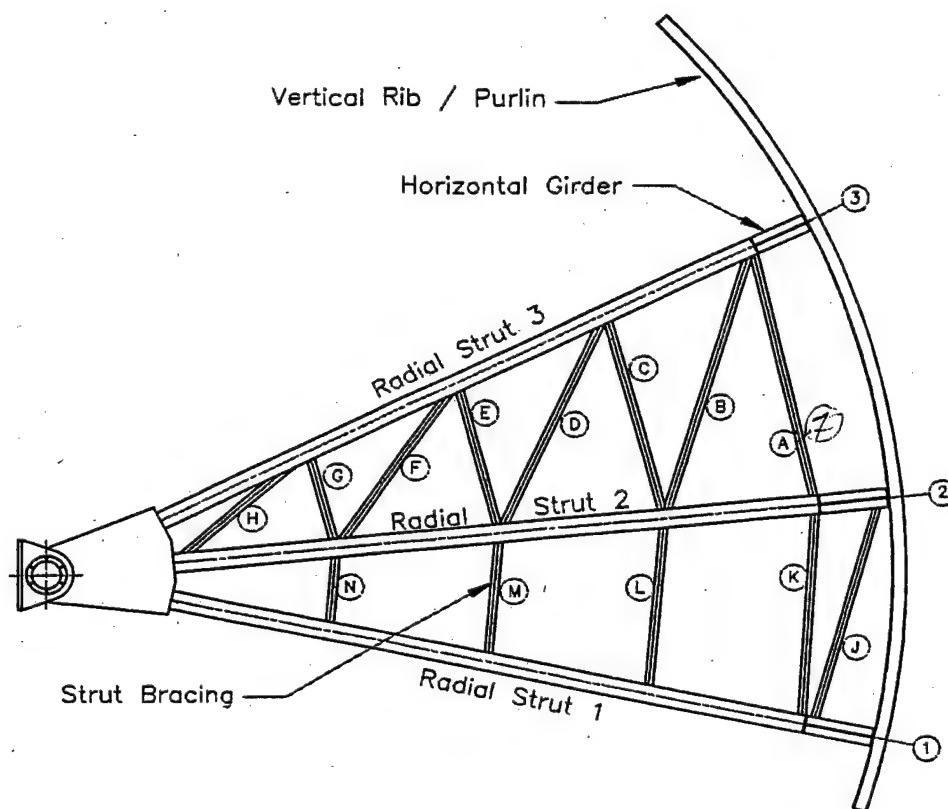
(21) Fine layer of mud flaking off, top.

(22) Bottom Seal, left.

(23) Sealing water, left.

(24) Seal ears, left.

Gate No. 4
 Right Elevation
 A-A



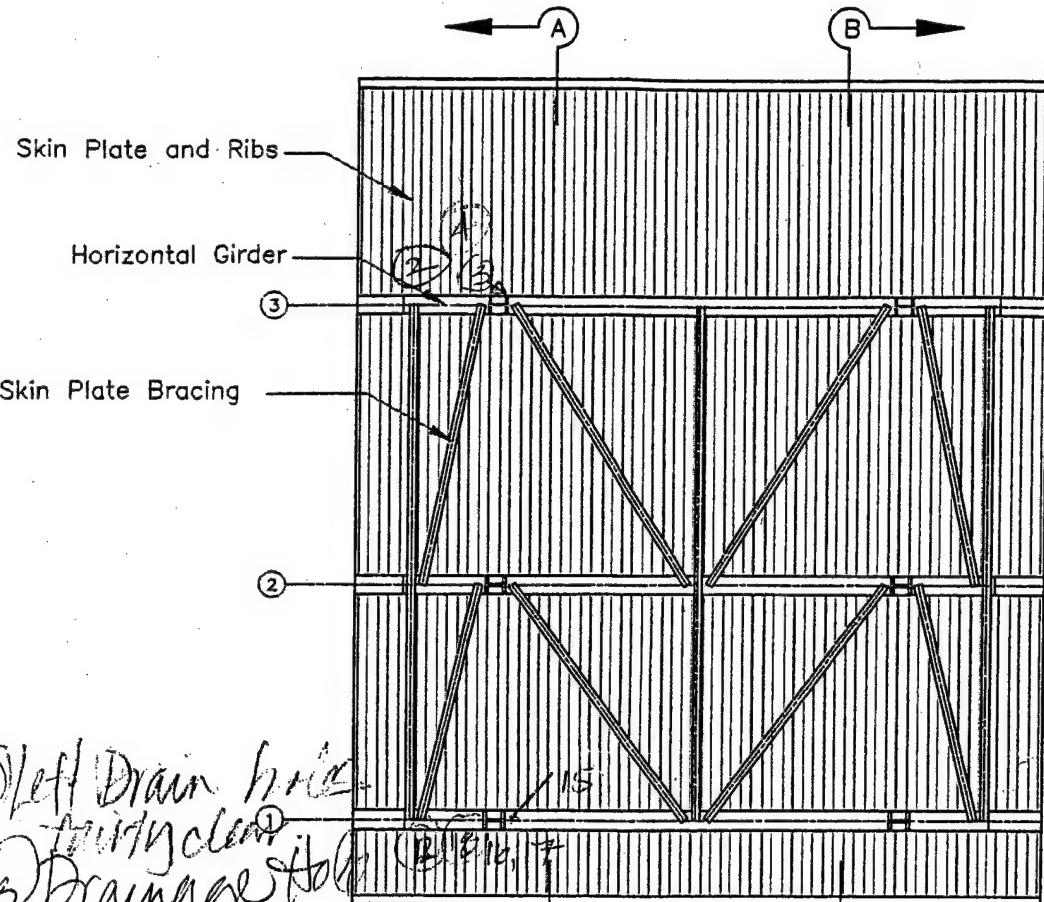
Member	Type	Depth d		Web t_w		Flange(s)			
		Plan (in)	Measured (in)	Plan (in)	Measured (in)	Plan (in)	Measured (in)	Plan (in)	Measured (in)
Strut 3	14 WF 202	15 5/8	17 7/16	15/16	—	15 3/4	16 1/4	1 1/2	✓
Strut 2	14 WF 342	17 1/2	17 7/16	1 9/16	—	16 3/8	16 1/4	2 7/16	✓
Strut 1	14 WF 398	18 1/4	18 1/4	1 13/16	—	16 5/8	16 1/4	2 13/16	✓
Brace A	14 WF 30	13 7/8	13 7/8	5/16	—	6 3/4	6 3/4	3/8	✓
Brace B	14 WF 30	13 7/8	13 7/8	5/16	—	6 3/4	6 3/4	3/8	✓
Brace C	14 WF 30	13 7/8	13 5/16	5/16	—	6 3/4	6 3/4	3/8	✓
Brace D	14 WF 30	13 7/8	13 3/16	5/16	—	6 3/4	6 3/4	3/8	✓
Brace E	14 WF 30	13 7/8	14	5/16	—	6 3/4	6 3/4	3/8	✓
Brace F	14 WF 30	13 7/8	13 5/16	5/16	—	6 3/4	10 1/16	3/8	5/16
Brace G	14 WF 30	13 7/8	13 5/16	5/16	—	6 3/4	10 1/16	3/8	5/16
Brace H	14 WF 30	13 7/8	14	5/16	—	6 3/4	6 3/4	3/8	5/16
Brace J	14 WF 30	13 7/8	14	5/16	—	6 3/4	6 3/4	3/8	✓
Brace K	14 WF 30	13 7/8	✓	5/16	—	6 3/4	6 3/4	3/8	✓
Brace L	14 WF 30	13 7/8	✓	5/16	—	6 3/4	10 1/8	3/8	✓
Brace M	14 WF 30	13 7/8	✓	5/16	—	6 3/4	6 3/4	3/8	5/16
Brace N	14 WF 30	13 7/8	14	5/16	—	6 3/4	6 3/4	3/8	✓

(F) Strange raised marks, like can in battns or skin, plate also

(B)

(C) Corrosion battn, bad riveting

Gate No. 4 Downstream Elevation



Member	Type	Depth d		Web t _w		Flange - End			
		Plan (in)	Measured (in)	Plan (in)	Measured (in)	b _f (in)	t _f (in)	Plan (in)	Measured (in)
Horiz. Girder 3	PL Girder	49 3/4	✓	7/16	✓	16	✓	7/8	✓
Horiz. Girder 2	PL Girder	60 1/2	60 3/8	3/4	✓	16 1/2	✓	1 1/4	1 5/16
Horiz. Girder 1	PL Girder	60 1/2	✓	1	—	16 1/2	✓	1 1/4	1 5/16
Purlins	ST 10 WF 31	10 1/2	✓	13/32	—	8 1/4	✓	5/8	✓
Skin Plate Bracing	ST 7 WF 15	7	7 15/16	1/4	5/16	6 3/4	✓	3/8	✓

(1) Gate ID

(2) Light Rust on purlins + top.

(3) Stiffeners not welded to flange face, top. Corroding at ends.

(4) Right, Bottom Seal.

(5) Strange Divots and paint� marks top main flange

(6) Light Rust on Vertical Brackets

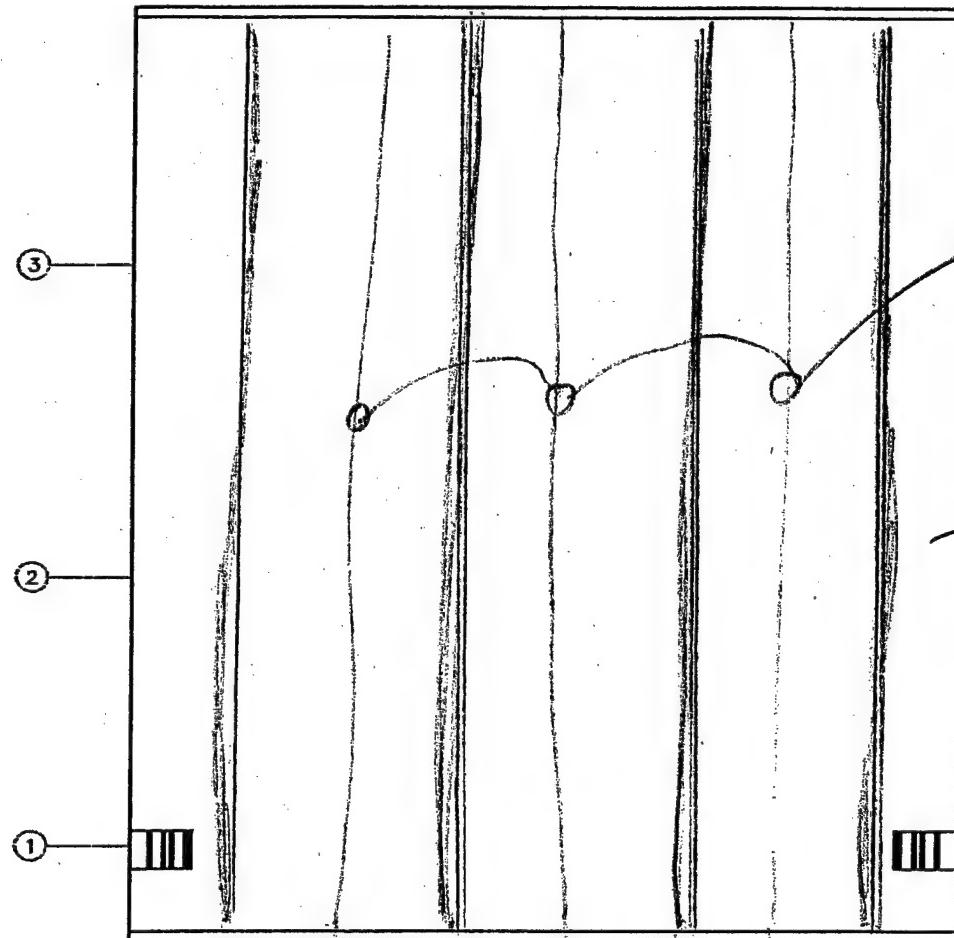
(7) Pounding PLATE bottom girder

(8) Before, Corrosion Spots + 15.

(9) After

(10) Submerging water, Bot seal, center.

Gate No. 4 Upstream Elevation



- TYPICAL PITTNG, LIGHTER THAN VISUAL

HDR Engineering, Inc.
Corp of Engineers - Walla Walla
Little Goose Dam

Inspection Team	SMP	TDB	HAY	AMA
Weather	SUNNY GO			

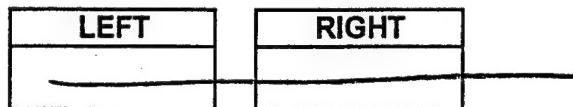
Date 10/19/00
Sheet 5

Gate No.

4

Operation and Trunnion Measurements

Racking Measurements: Bottom of Gate and Spillway



TOO MUCH LEAKAGE
AND FLOW FROM
STOPLOGS TO
MEASURE

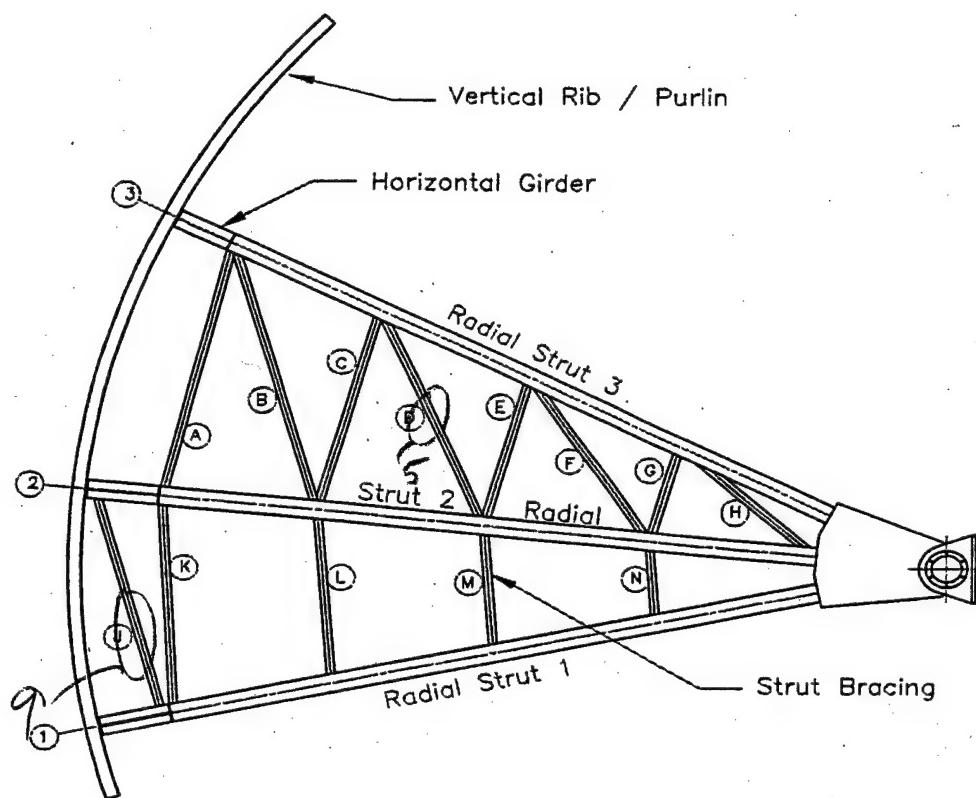
Transverse Trunnion Hub Movement, No Load on Gate: Closed-Open-Closed

	LEFT		RIGHT	
	Inside	Outside (pier)	Inside	Outside (pier)
Initial Gate Closed	$\frac{15}{32}$	$\frac{13}{32}$	$\frac{14}{32}$	$\frac{27}{32}$
Gate Full Open	$\frac{15}{32}$	$\frac{12}{32}$	$\frac{14}{32}$	$\frac{27}{32}$
Final Gate Closed	$\frac{15}{32}$	$\frac{12}{32}$	$\frac{14}{32}$	$\frac{28}{32}$

3-D Trunnion Hub Movements - Unloaded vs. Loaded

LEFT		RIGHT						
	No Load Void Dry	No Load Void Dry	Full Load Void Full					
Vertical	0.0000	+0.0030	-0.0010					
US / DS	0.0000	+0.0320	-0.0020					
Transverse	15/32	12/32	15/32	12/32	14/32	28/32	14/32	27/32
	Inside	Outside	Inside	Outside	Inside	Outside	Inside	Outside

Gate No. 5
Left Elevation B-B



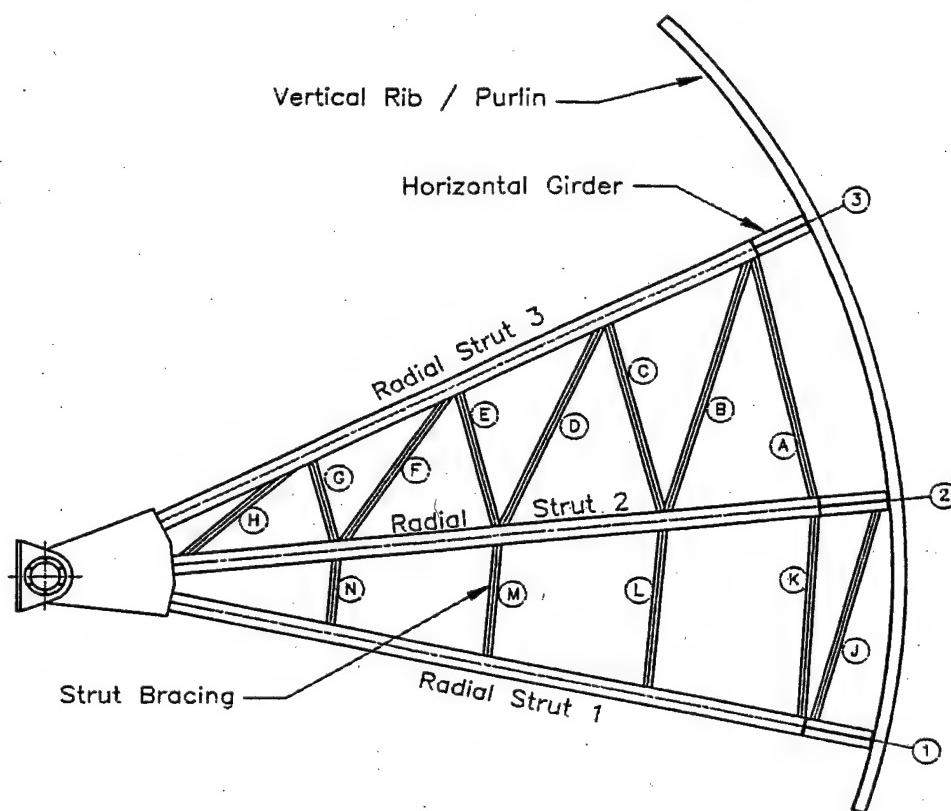
Member	Type	Depth		Web		Flange(s)			
		Plan (in)	Measured (in)	Plan (in)	Measured (in)	Plan (in)	Measured (in)	Plan (in)	Measured (in)
Strut 3	14 WF 202	15 5/8	13 15/16	15/16		15 3/4	15 3/4	1 1/2	1 1/2
Strut 2	14 WF 342	17 1/2	17 1/2	1 9/16		16 3/8	16 3/4	2 7/16	2 7/16
Strut 1	14 WF 398	18 1/4	18 1/4	1 13/16		16 5/8	16 5/8	2 13/16	2 3/4
Brace A	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 7/8	3/8	7/16
Brace B	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 3/4	3/8	5/8
Brace C	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 7/8	3/8	7/16
Brace D	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 7/8	3/8	7/16
Brace E	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 3/4	3/8	7/16
Brace F	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 7/8	3/8	7/16
Brace G	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 7/8	3/8	7/16
Brace H	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 7/8	3/8	7/16
Brace J	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 7/8	3/8	7/16
Brace K	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 7/8	3/8	7/16
Brace L	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 7/8	3/8	7/16
Brace M	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 7/8	3/8	7/16
Brace N	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 7/8	3/8	7/16

5. Paint Failure w/ light rust (Typ all braces)

9. Light Rust on Dia. Brace (Typ.)

13. Overall shot of LEFT FRAME NOTE BAD PAINT

Gate No. 5
 Right Elevation
 A-A



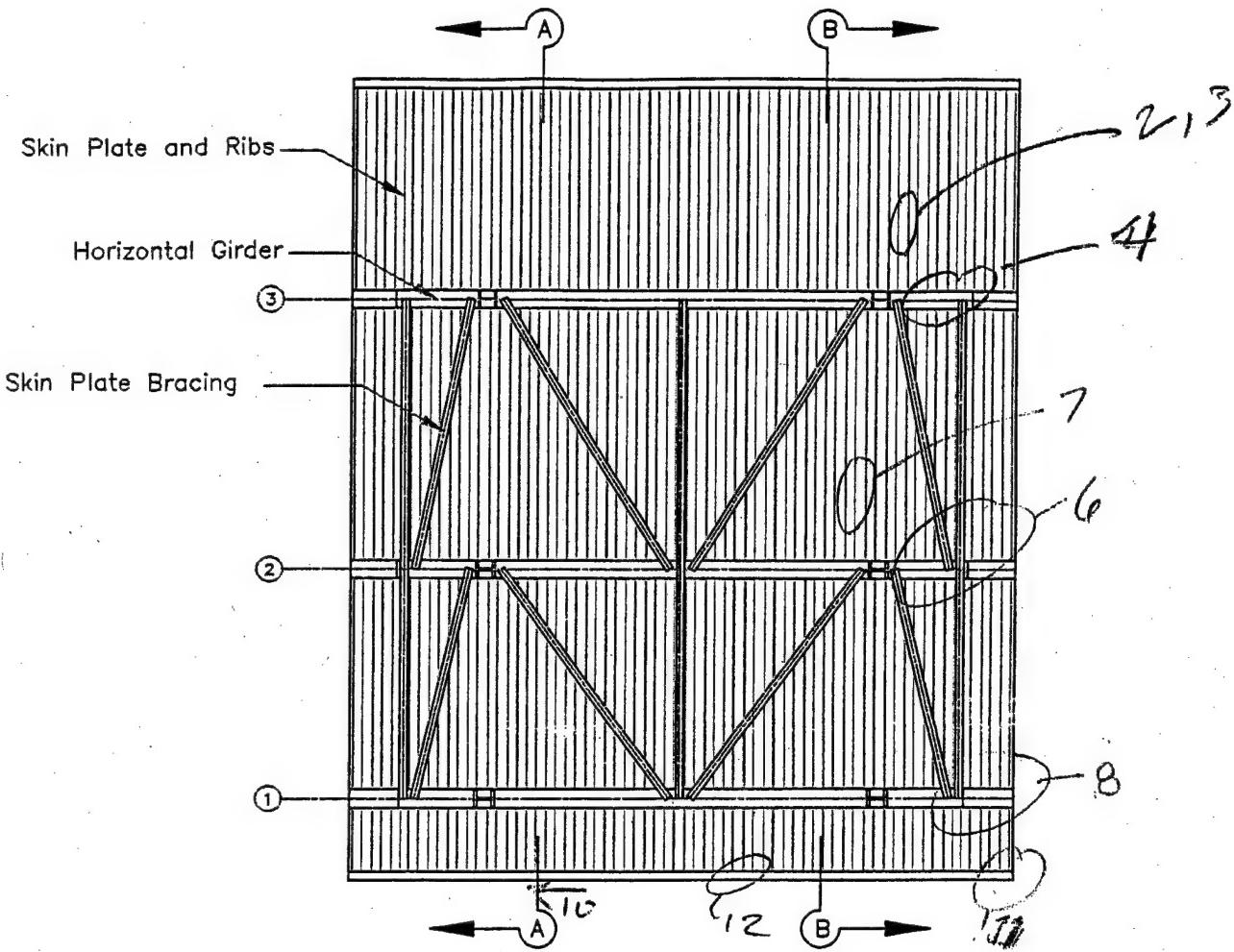
Member	Type	Depth d		Web t_w		Flange(s)			
		Plan (in)	Measured (in)	Plan (in)	Measured (in)	Plan (in)	Measured (in)	Plan (in)	Measured (in)
Strut 3	14 WF 202	15 5/8	15 7/8	15/16		15 3/4	15 3/4	1 1/2	1 1/2
Strut 2	14 WF 342	17 1/2	17 1/2	1 9/16		16 3/8	16 3/8	2 7/16	2 7/16
Strut 1	14 WF 398	18 1/4	18 3/8	1 13/16		16 5/8	16 5/8	2 13/16	2 13/16
Brace A	14 WF 30	13 7/8	13 5/16	5/16		6 3/4	6 15/16	3/8	3/8
Brace B	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 15/16	3/8	3/8
Brace C	14 WF 30	13 7/8	13 5/16	5/16		6 3/4	6 7/8	3/8	3/8
Brace D	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 7/8	3/8	3/8
Brace E	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	10 15/16	3/8	3/8
Brace F	14 WF 30	13 7/8	14	5/16		6 3/4	6 3/4	3/8	3/8
Brace G	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8
Brace H	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8
Brace J	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 13/16	3/8	3/8
Brace K	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8
Brace L	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8
Brace M	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8
Brace N	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8

14. OVERALL Pic of Gate

15. LEFT TRUNNION

16. RT. TRUNNION w/clogged Drain hole

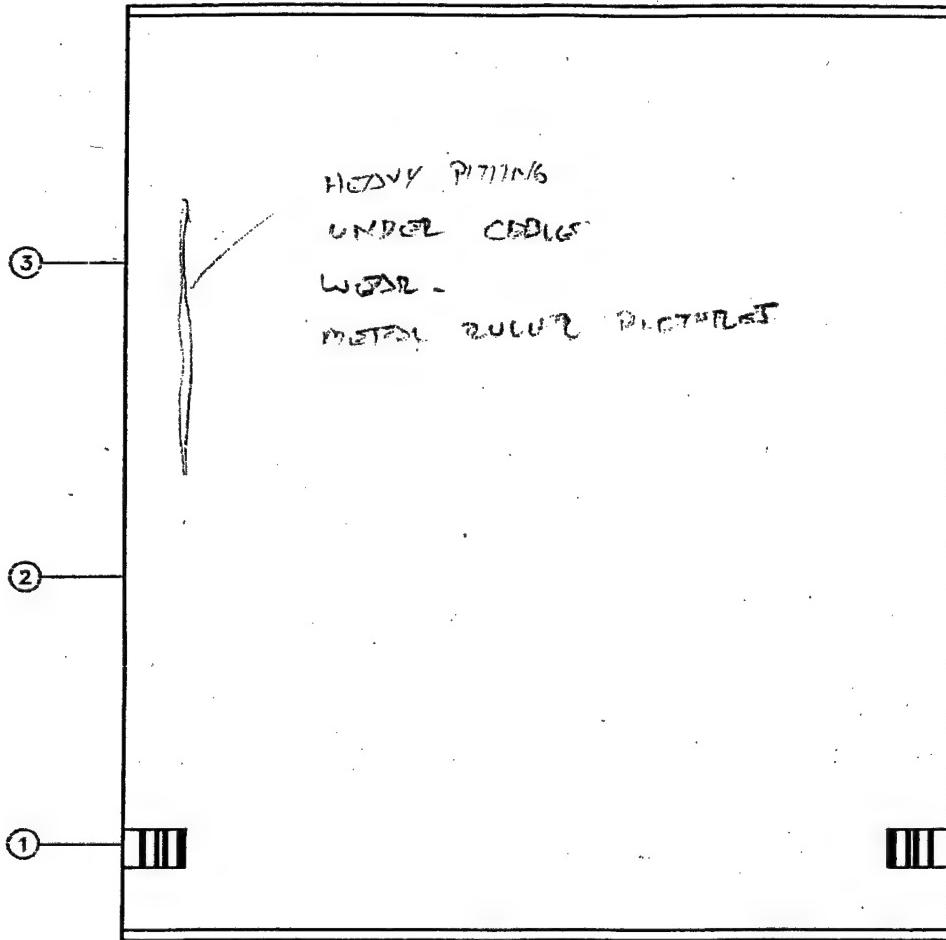
Gate No. 5 Downstream Elevation



Member	Type	Depth d		Web t _w		Flange - End			
		Plan (in)	Measured (in)	Plan (in)	Measured (in)	Plan (in)	Measured (in)	Plan (in)	Measured (in)
Horiz. Girder 3	PL Girder	49 3/4	49 7/8	7/16	7/16	16	16	7/8	7/8
Horiz. Girder 2	PL Girder	60 1/2	60 1/2	3/4	3/4	16 1/2	16 1/2	1 1/4	1 1/4
Horiz. Girder 1	PL Girder	60 1/2	60 1/2	1	1 1/16	16 1/2	16 1/2	1 1/4	1 1/4
Purlins	ST 10 WF 31	10 1/2	10 1/2	13/32	13/32	8 1/4	8 1/4	5/8	5/8
Skin Plate Bracing	ST 7 WF 15	7	7	1/4	5/110	6 3/4	6 3/4	3/8	3/8

- 2,3. Delaminated Putty and light Rust on Gate Face
 4. Light Rust Top Girder
 6. Light Rust on Girders AND Braces NOTE Delam on gate Face
 7. Delam. on gate face w/ light Rust. These Delam spots are typ across ENTIRE GATE FACE.
 8. Side seal leak @ Bot Girder NOTE Light Rust & Mineral Dep.
 10. Bottom Seal leaking Right
 11. LEFT CORNER leak
 12. Bottom Plate w/ STANDING H₂O

Gate No. 5 Upstream Elevation



- BEST CONDITION OF ANY GATES SIGHT
- MINIMAL PITTING
- EXCESSIVE SOD LOG LEAK, COULD NOT GO UNDER SILL DO TO FALLING WATER -

Gate No.

5

Operation and Trunnion Measurements

Racking Measurements: Bottom of Gate and Spillway

LEFT	RIGHT
39 1/4	39

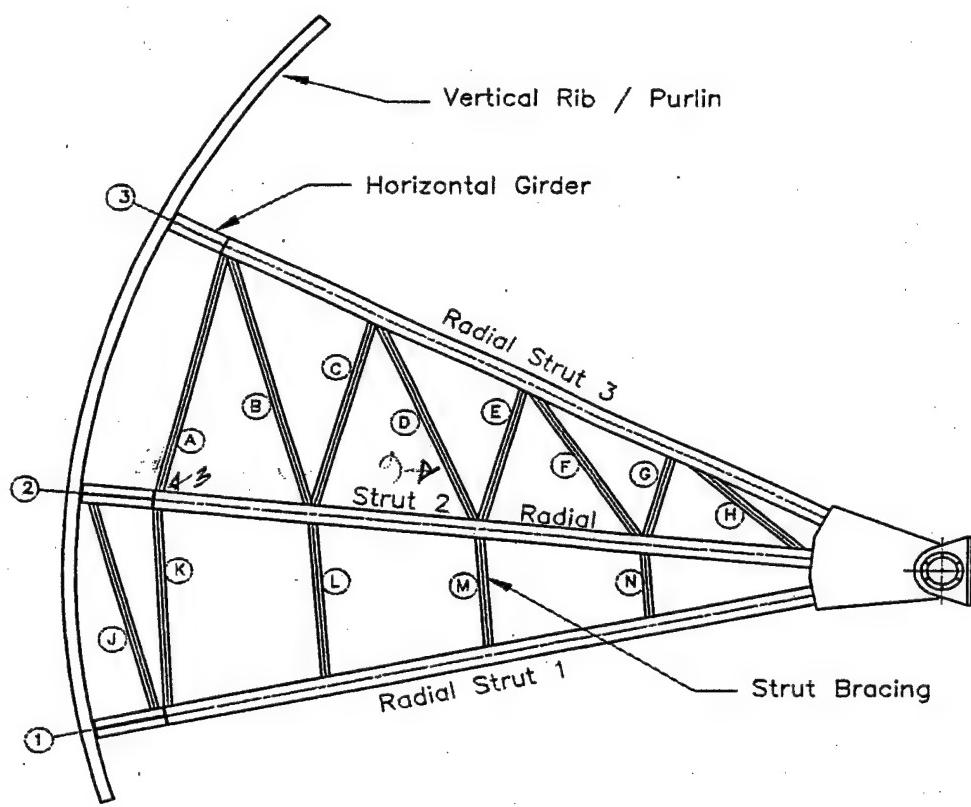
Transverse Trunnion Hub Movement, No Load on Gate: Closed-Open-Closed

	LEFT		RIGHT	
	Inside	Outside (pier)	Inside	Outside (pier)
Initial Gate Closed	22/32	16/32	20/32	18/32
Gate Full Open	21/32	15/32	20/32	18/32
Final Gate Closed	21/32	16/32	20/32	18/32

3-D Trunnion Hub Movements - Unloaded vs. Loaded

	LEFT		RIGHT	
	No Load Void Dry	Full Load Void Full	No Load Void Dry	Full Load Void Full
Vertical	+0.0010	-0.0085	0.0005	-0.0020
US / DS	0.0000	+0.0230	0.0000	+0.0380
Transverse	21/32	16/32	22/32	16/32
	Inside	Outside	Inside	Outside

Gate No. 6
 Left Elevation B-B



Member	Type	Depth d		Web t_w		Flange(s)			
		Plan (in)	Measured (in)						
Strut 3	14 WF 202	15 5/8	✓	15/16	—	15 3/4	✓	1 1/2	✓
Strut 2	14 WF 342	17 1/2	✓	1 9/16	—	16 3/8	✓	2 7/16	✓
Strut 1	14 WF 398	18 1/4	✓	1 13/16	—	16 5/8	✓	2 13/16	✓
Brace A	14 WF 30	13 7/8	✓	5/16	—	6 3/4	✓	3/8	✓
Brace B	14 WF 30	13 7/8	✓	5/16	—	6 3/4	✓	3/8	✓
Brace C	14 WF 30	13 7/8	✓	5/16	—	6 3/4	✓	3/8	✓
Brace D	14 WF 30	13 7/8	✓	5/16	—	6 3/4	✓	3/8	✓
Brace E	14 WF 30	13 7/8	✓	5/16	—	6 3/4	✓	3/8	✓
Brace F	14 WF 30	13 7/8	✓	5/16	—	6 3/4	✓	3/8	✓
Brace G	14 WF 30	13 7/8	✓	5/16	—	6 3/4	✓	3/8	✓
Brace H	14 WF 30	13 7/8	✓	5/16	—	6 3/4	✓	3/8	✓
Brace J	14 WF 30	13 7/8	✓	5/16	—	6 3/4	✓	3/8	✓
Brace K	14 WF 30	13 7/8	✓	5/16	—	6 3/4	✓	3/8	✓
Brace L	14 WF 30	13 7/8	✓	5/16	—	6 3/4	✓	3/8	✓
Brace M	14 WF 30	13 7/8	✓	5/16	—	6 3/4	✓	3/8	✓
Brace N	14 WF 30	13 7/8	✓	5/16	—	6 3/4	✓	3/8	✓

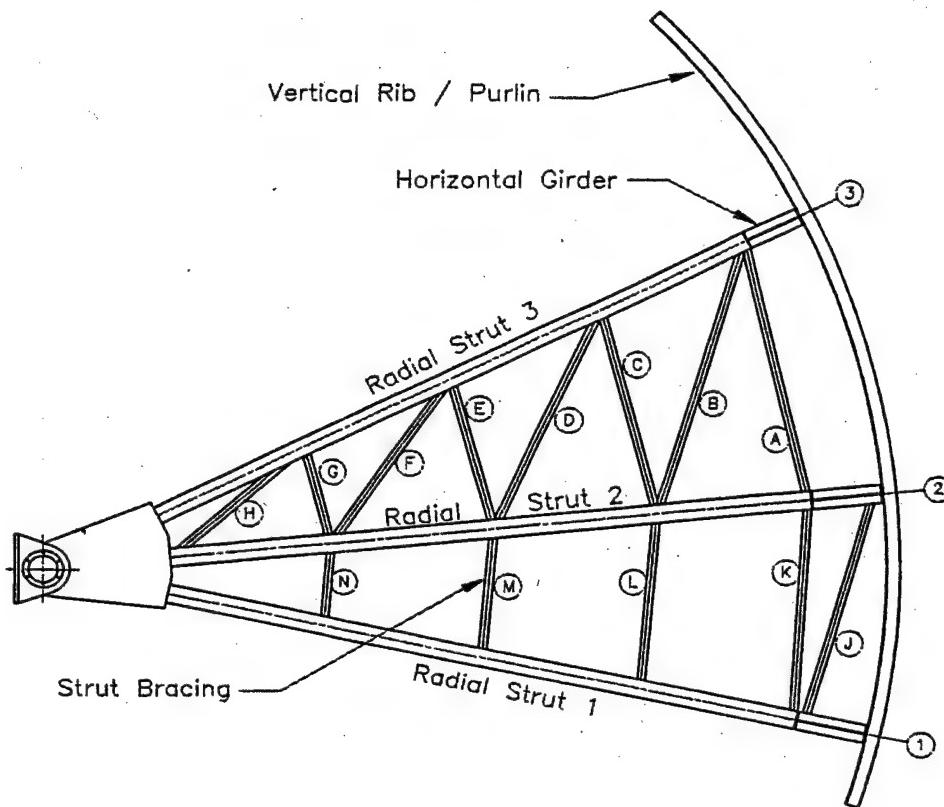
- (1) Paint free
- (2) Rust free, bright metal
- (3) Light Rust oil A
- (4) Weld 2 m inside of 4th purlin
- (5) Flaking paint/mine deposit
- (6) Paint film from previous
- (7) Pitting 1 coat of red paint.
- (8) Paint free of zinc rich paint.

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 Little Goose Dam

Inspection Team SMP TDB HAY
 Weather _____

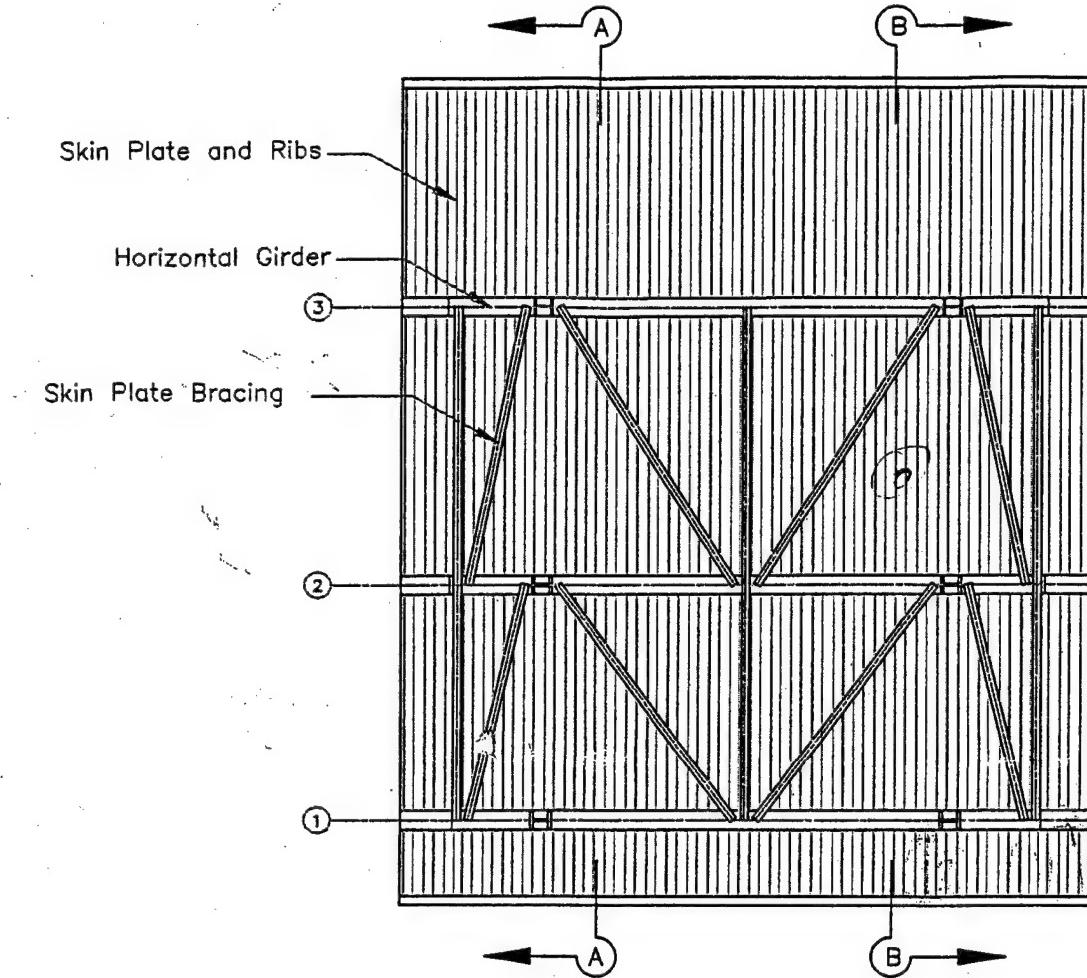
Date 10/11
 Sheet 2

Gate No. 10
Right Elevation
A-A



Member	Type	Depth d		Web t_w		Flange(s)			
		Plan (in)	Measured (in)						
Strut 3	14 WF 202	15 5/8	15 13/16	15/16	—	15 3/4	15 5/8	1 1/2	✓
Strut 2	14 WF 342	17 1/2	✓	1 9/16	—	16 3/8	16 7/16	2 7/16	✓
Strut 1	14 WF 398	18 1/4	✓	1 13/16	—	16 5/8	1 10 1/2	2 13/16	✓
Brace A	14 WF 30	13 7/8	✓	5/16	—	6 3/4	6 11/16	3/8	5/16
Brace B	14 WF 30	13 7/8	✓	5/16	—	6 3/4	6 11/16	3/8	5/16
Brace C	14 WF 30	13 7/8	13 5/16	5/16	—	6 3/4	6 11/16	3/8	5/16
Brace D	14 WF 30	13 7/8	13 5/16	5/16	—	6 3/4	6 11/16	3/8	5/16
Brace E	14 WF 30	13 7/8	13 5/16	5/16	—	6 3/4	6 11/16	3/8	5/16
Brace F	14 WF 30	13 7/8	14	5/16	—	6 3/4	6 11/16	3/8	5/16
Brace G	14 WF 30	13 7/8	✓	5/16	—	6 3/4	6 11/16	3/8	5/16
Brace H	14 WF 30	13 7/8	13 5/16	5/16	—	6 3/4	6 11/16	3/8	5/16
Brace J	14 WF 30	13 7/8	✓	5/16	—	6 3/4	6 11/16	3/8	5/16
Brace K	14 WF 30	13 7/8	✓	5/16	—	6 3/4	6 11/16	3/8	5/16
Brace L	14 WF 30	13 7/8	✓	5/16	—	6 3/4	6 11/16	3/8	5/16
Brace M	14 WF 30	13 7/8	✓	5/16	—	6 3/4	6 11/16	3/8	5/16
Brace N	14 WF 30	13 7/8	14	5/16	—	6 3/4	6 11/16	3/8	5/16

Gate No. V Downstream Elevation



(10) (20) Leak in middle, water coming through hole

Member	Type	Depth d		Web t_w		Flange - End			
		Plan (in)	Measured (in)	Plan (in)	Measured (in)	Plan (in)	Measured (in)	Plan (in)	Measured (in)
Horiz. Girder 3	PL Girder	49 3/4	✓	7/16	✓	16	✓	7/8	15/16
Horiz. Girder 2	PL Girder	60 1/2	60 1/2	3/4	✓	16 1/2	✓	1 1/4	✓
Horiz. Girder 1	PL Girder	60 1/2	60 1/2	1	—	16 1/2	✓	1 1/4	✓
Purlins	ST 10 WF 31	10 1/2	✓	13/32	—	8 1/4	✓	5/8	✓
Skin Plate Bracing	ST 7 WF 15	7	7 1/4	1/4	✓	6 3/4	✓	3/8	✓

(1) Strange rivets in skin plate

(2) Rust in member flange

(3) Corroded rivets in middle of web

(4) Bottom girder damage

(5) Lack of drainage on bottom steel

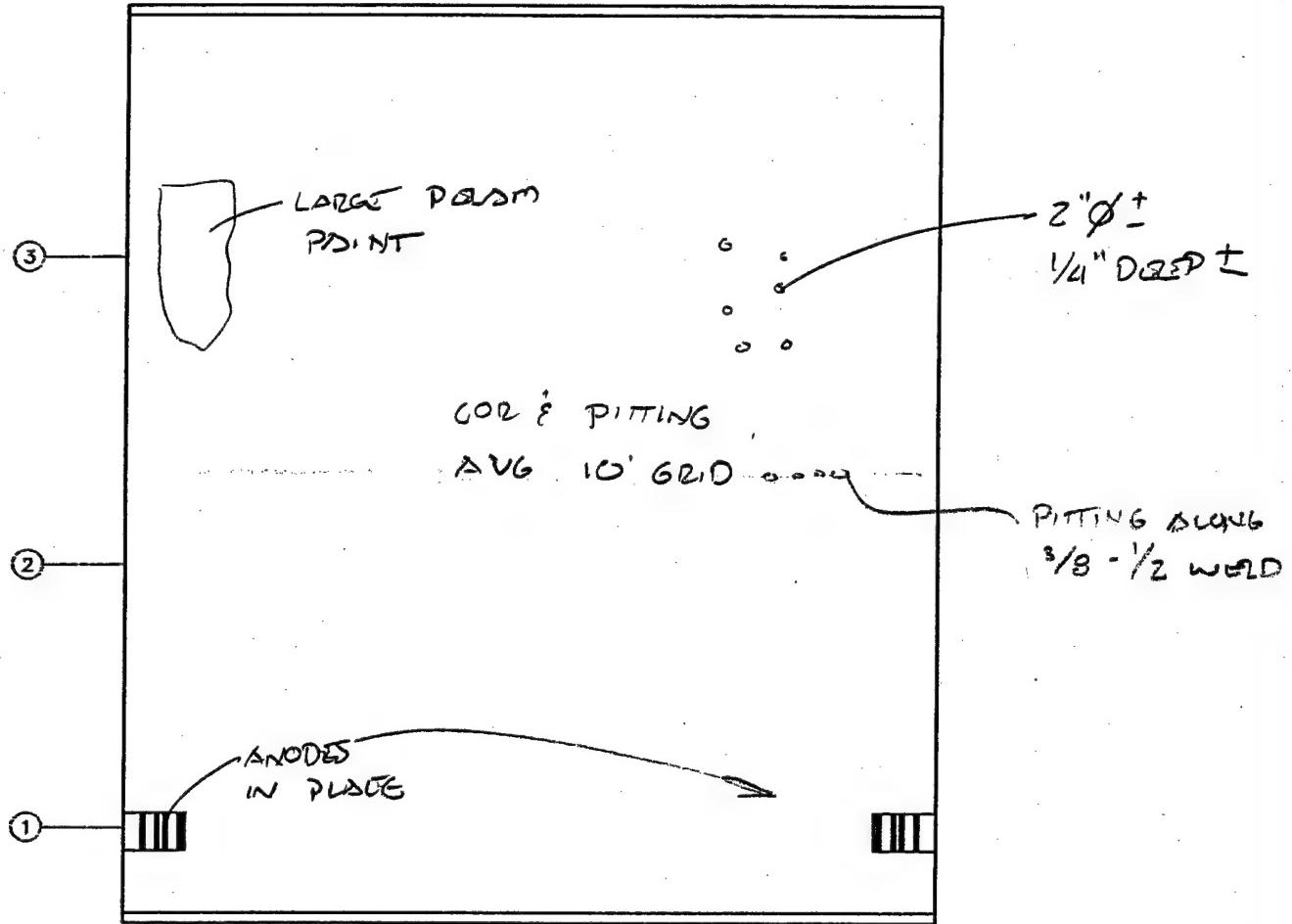
(6) Bottom seal

(7) Drainage hole from bottom girder

(8) Side seal, right

(9) Side seal, left

Gate No. 6 Upstream Elevation



BRAKE MOTOR LOCKED & BURNING @ 25' OPEN 45 min delay

HDR Engineering, Inc.
Corp of Engineers - Walla Walla
Little Goose Dam

Inspection Team SMP TDB HAY AMA
Weather CLDY 55

Date 10/18/00
Sheet 5

Gate No. 6

Operation and Trunnion Measurements

Racking Measurements: Bottom of Gate and Spillway

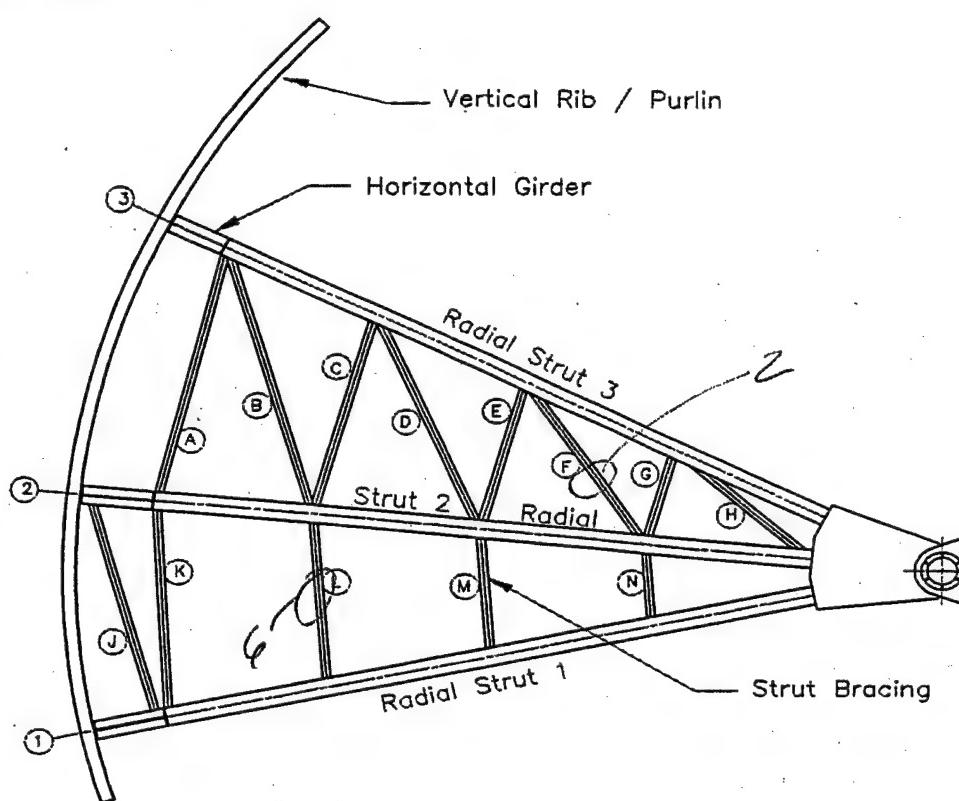
LEFT	RIGHT
41	41

Transverse Trunnion Hub Movement, No Load on Gate: Closed-Open-Closed

	LEFT		RIGHT	
	Inside	Outside (pier)	Inside	Outside (pier)
Initial Gate Closed	21/32	17/32	16/32	21/32
Gate Full Open	21/32	17/32	15/32	22/32
Final Gate Closed	21/32	17/32	16/32	21/32

3-D Trunnion Hub Movements - Unloaded vs. Loaded

	LEFT				RIGHT			
	No Load Void Dry	Full Load Void Full	No Load Void Dry	Full Load Void Full				
Vertical	0.0000	0.0000	0.0000	0.0001				
US / DS	-0.0015	+0.0340	0.0000	+0.0450				
Transverse	21/32	17/32	21/32	17/32	16/32	21/32	16/32	21/32
	Inside	Outside	Inside	Outside	Inside	Outside	Inside	Outside



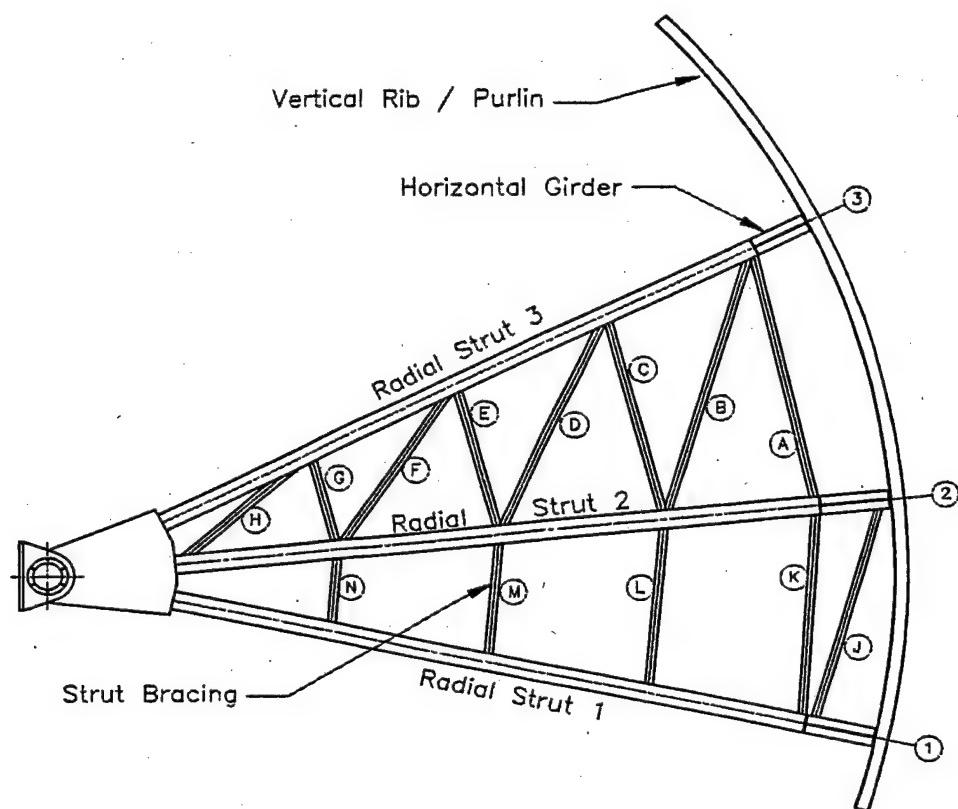
Gate No. 7
 Left Elevation B-B
 Right

Member	Type	Depth d		Web t _w		Flange(s)	
		Plan (in)	Measured (in)	Plan (in)	Measured (in)	Plan (in)	Measured (in)
Strut 3	14 WF 202	15 5/8	15 5/8	15/16		15 3/4	15 3/4
Strut 2	14 WF 342	17 1/2	17 1/2	19/16		16 3/8	16 3/8
Strut 1	14 WF 398	18 1/4	18 1/4	1 13/16		16 5/8	16 5/8
Brace A	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 3/4
Brace B	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 3/4
Brace C	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 3/4
Brace D	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 3/4
Brace E	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 3/4
Brace F	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 3/4
Brace G	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 3/4
Brace H	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 3/4
Brace J	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 3/4
Brace K	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 3/4
Brace L	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 3/4
Brace M	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 3/4
Brace N	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 3/4

Z. PEERED RUST @ DH F

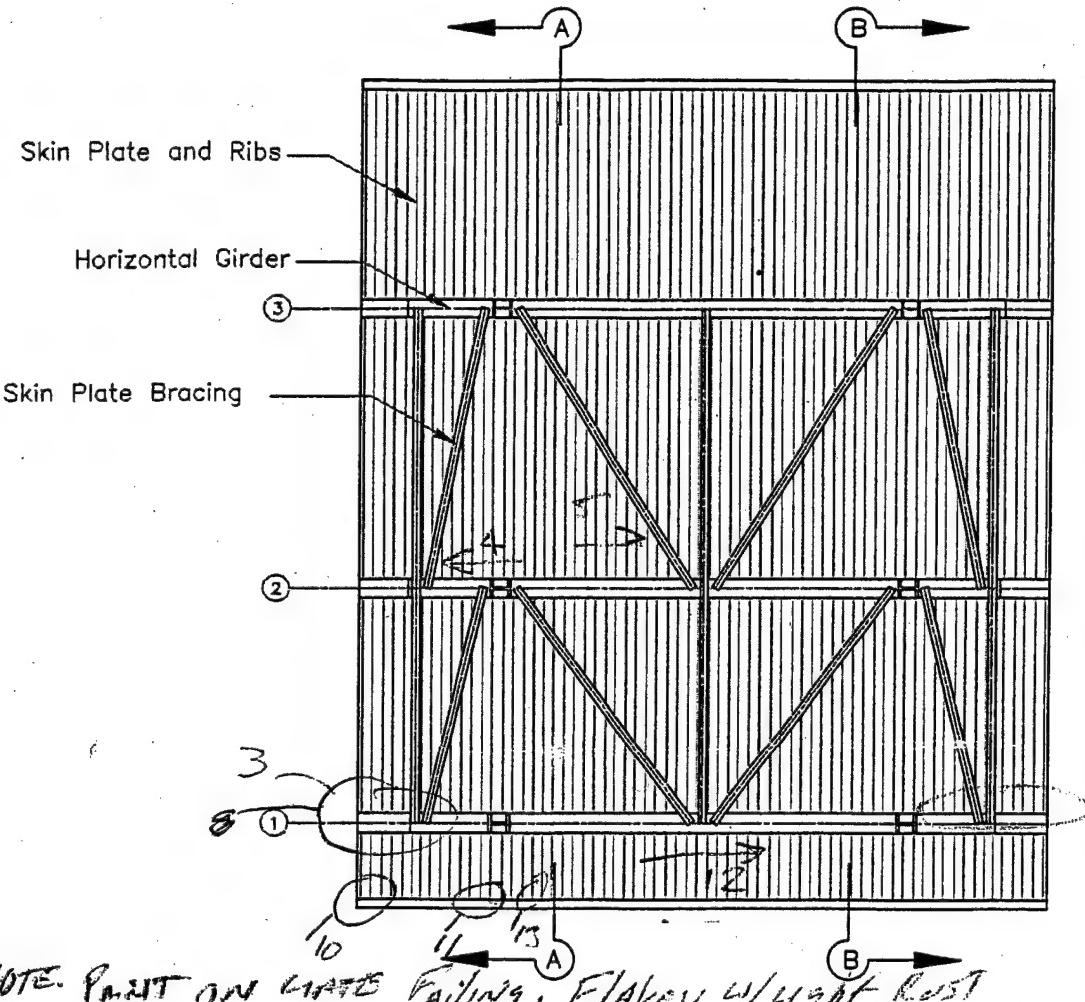
(e) Deflection in Flange Vert. "L", ± 1/4" deflection

Gate No. 7
 Right Elevation
 A-A



Member	Type	Depth d		Web t_w		Flange(s)			
		Plan (in)	Measured (in)	Plan (in)	Measured (in)	Plan (in)	Measured (in)	Plan (in)	Measured (in)
Strut 3	14 WF 202	15 5/8	15 5/8	15/16		15 3/4	15 3/4	1 1/2	1 1/2
Strut 2	14 WF 342	17 1/2	17 1/2	19/16		16 3/8	16 3/8	2 7/16	2 7/16
Strut 1	14 WF 398	18 1/4	18 1/4	1 13/16		16 5/8	16 1/2	2 13/16	2 13/16
Brace A	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8
Brace B	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 13/16	3/8	3/8
Brace C	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 13/16	3/8	3/8
Brace D	14 WF 30	13 7/8	14	5/16		6 3/4	6 3/4	3/8	3/8
Brace E	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 13/16	3/8	3/8
Brace F	14 WF 30	13 7/8	13 5/8	5/16		6 3/4	6 3/4	3/8	3/8
Brace G	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8
Brace H	14 WF 30	13 7/8	13 13/16	5/16		6 3/4	6 3/4	3/8	3/8
Brace J	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 13/16	3/8	3/8
Brace K	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 13/16	3/8	3/8
Brace L	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8
Brace M	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8
Brace N	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 3/4	3/8	3/8

Gate No. 7 Downstream Elevation



NOTE: PAINT ON GATE FAILING, FLAKY w/light Rust

Member	Type	Depth d		Web t_w		Flange - End			
		Plan (in)	Measured (in)	Plan (in)	Measured (in)	Plan (in)	Measured (in)	Plan (in)	Measured (in)
Horiz. Girder 3	PL Girder	49 3/4	49 3/8	7/16	7/16	16	16	7/8	7/8
Horiz. Girder 2	PL Girder	60 1/2	60 1/2	3/4	3/4	16 1/2	16 1/2	1 1/4	1 1/4
Horiz. Girder 1	PL Girder	60 1/2	60 1/2	1	1 1/8	16 1/2	16 1/2	1 1/4	1 1/4
Purlins	ST 10 WF 31	10 1/2	10 1/2	13/32		8 1/4	8 3/16	5/8	5/8
Skin Plate Bracing	ST 7 WF 15	7	7	1/4	1/4	6 3/4	6 3/16	3/8	3/8

3. LEAK IN SIDE SEAL w/ standing H₂O inc Bot. G. end
4. Pt. FRAME light Rust
5. Looking left NOTE Light Rust on all members
6. Standing H₂O on Pt. Girder
7. GATE FACE PAINT FAILURE
10. SIDE SEAL LEAK w/ light Rust AND min. Deposit
11. Bottom Pt. Full of H₂O w/ muck
12. Along Bot Girder Light Rust on All members
13. Moderate Rust on Purlin webs DUE TO standing H₂O
14. Moderate Rust on BRACE P/Hs.

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Little Goose Dam

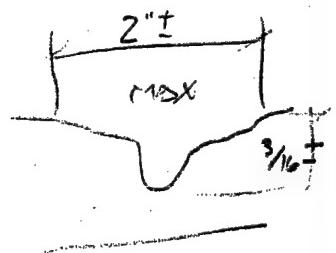
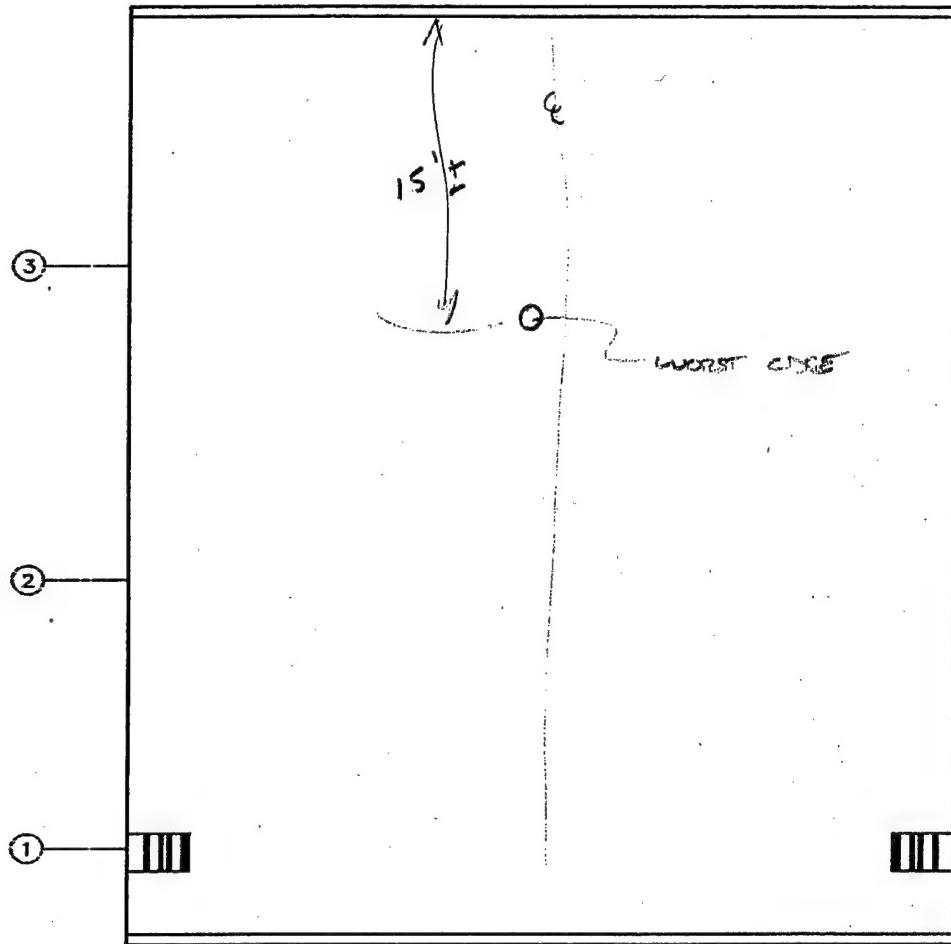
Inspection Team SMP TDB/HAY
Weather

Date 10/11/2002
Sheet 4

Gate No.

4

Upstream Elevation



MUCH RUSTIER CONDITION THAN GRANITE

EVIDENCE OF POST WED & GRIND

HDR Engineering, Inc.
Corp of Engineers - Walla Walla
Little Goose Dam

Inspection Team SMP TDB HAY AMA
Weather

Date 10/17/00
Sheet 5

Gate No. 7 Operation and Trunnion Measurements

Racking Measurements: Bottom of Gate and Spillway

LEFT	RIGHT
38 1/2	39

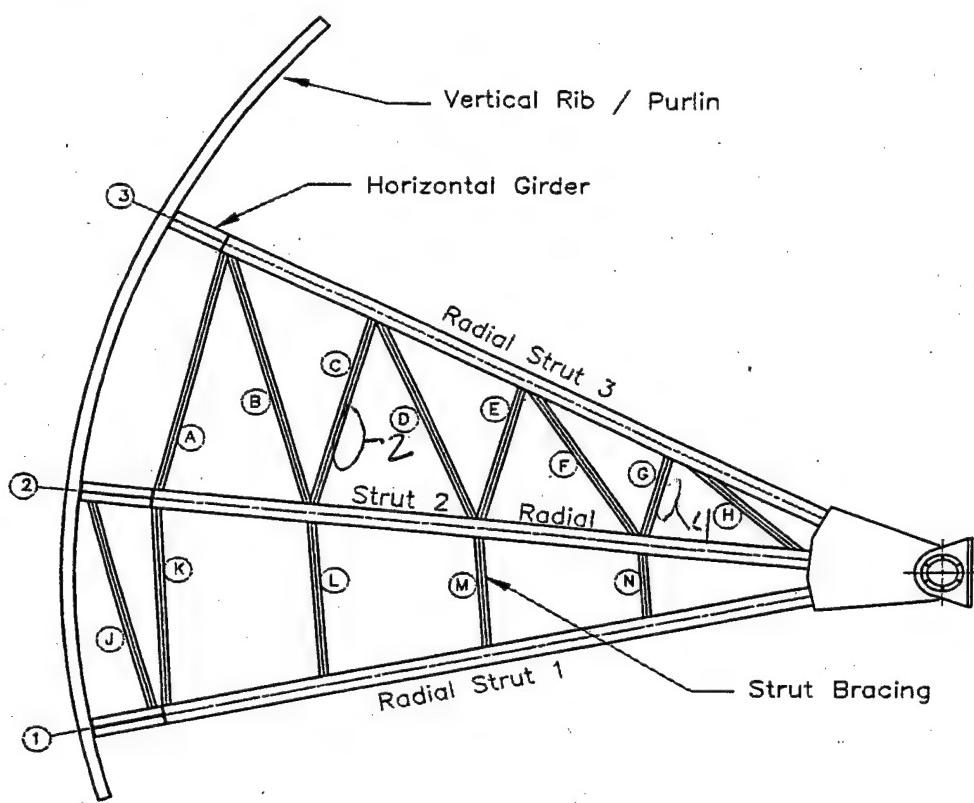
Transverse Trunnion Hub Movement, No Load on Gate: Closed-Open-Closed

	LEFT		RIGHT	
	Inside	Outside (pier)	Inside	Outside (pier)
Initial Gate Closed	$\frac{23}{32}$	$\frac{21}{32}$	$\frac{15}{32}$	$\frac{23}{32}$
Gate Full Open	$\frac{24}{32}$	$\frac{23}{32}$	$\frac{14}{32}$	$\frac{24}{32}$
Final Gate Closed	$\frac{23}{32}$	$\frac{21}{32}$	$\frac{15}{32}$	$\frac{23}{32}$

3-D Trunnion Hub Movements - Unloaded vs. Loaded

LEFT				RIGHT			
	No Load Void Dry	Full Load Void Full		No Load Void Dry	Full Load Void Full		
Vertical	+0.002	-0.0025		-0.001	+0.012		
US / DS	+0.0005	+0.037		0.0000	+0.0300		
Transverse	23/32	29/32	23/32	21/32	15/32	23/32	16/32
	Inside	Outside	Inside	Outside	Inside	Outside	Inside

Gate No. 8
Left Elevation B-B



Member	Type	Depth d		Web t_w		Flange(s)			
		Plan (in)	Measured (in)						
Strut 3	14 WF 202	15 5/8	15 7/16	15/16		15 3/4	15 3/16	1 1/2	1 3/16
Strut 2	14 WF 342	17 1/2	17 1/2	19/16		16 3/8	16 3/16	2 7/16	2 1/2
Strut 1	14 WF 398	18 1/4	18 1/2	1 13/16		16 5/8	16 3/16	2 13/16	2 13/16
Brace A	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 13/16	3/8	3/8
Brace B	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 13/16	3/8	3/8
Brace C	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 13/16	3/8	3/8
Brace D	14 WF 30	13 7/8	13 11/16	5/16		6 3/4	6 13/16	3/8	3/8
Brace E	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 13/16	3/8	3/8
Brace F	14 WF 30	13 7/8	13 11/16	5/16		6 3/4	6 13/16	3/8	3/8
Brace G	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 13/16	3/8	3/8
Brace H	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 3/16	3/8	3/8
Brace J	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 3/16	3/8	3/8
Brace K	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 13/16	3/8	3/8
Brace L	14 WF 30	13 7/8	13 3/4	5/16		6 3/4	6 7/8	3/8	29
Brace M	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8
Brace N	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8

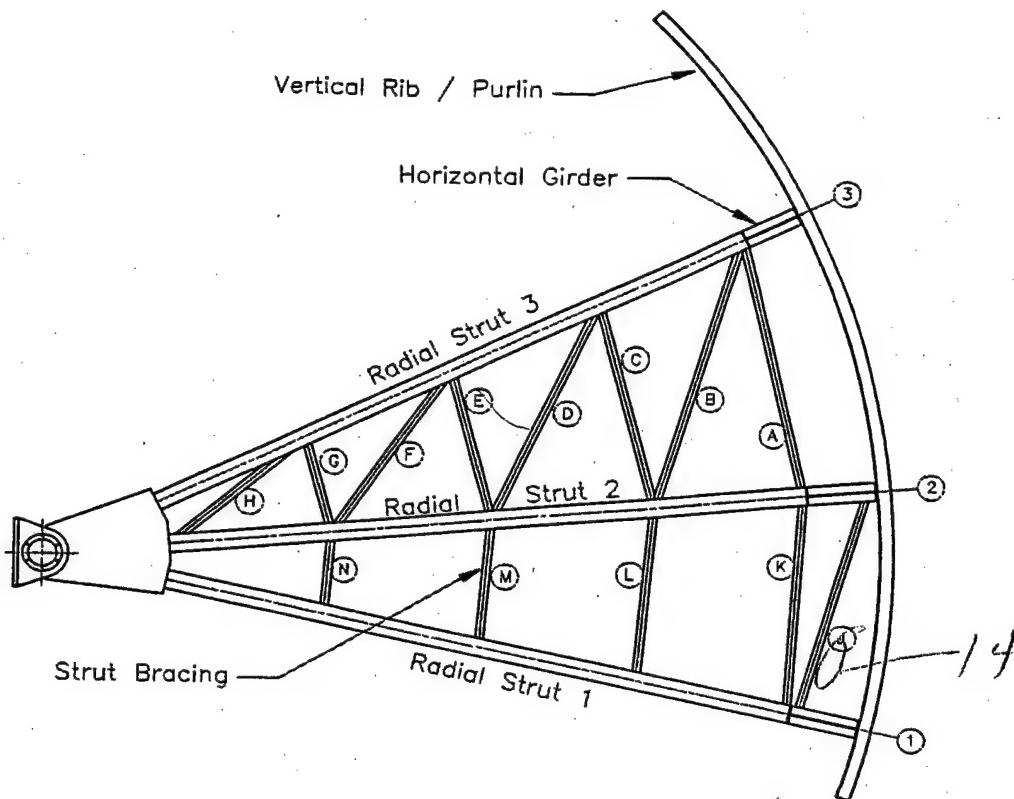
2. Light Rust on vert Rec. "C"

3. Light Flaky Rust on Diagonal "D"

4. Light rust Coating Flaking away

5. Overall Pic of LEFT Struts Light Rust & Delam Coating

Gate No. 5
 Right Elevation
 A-A

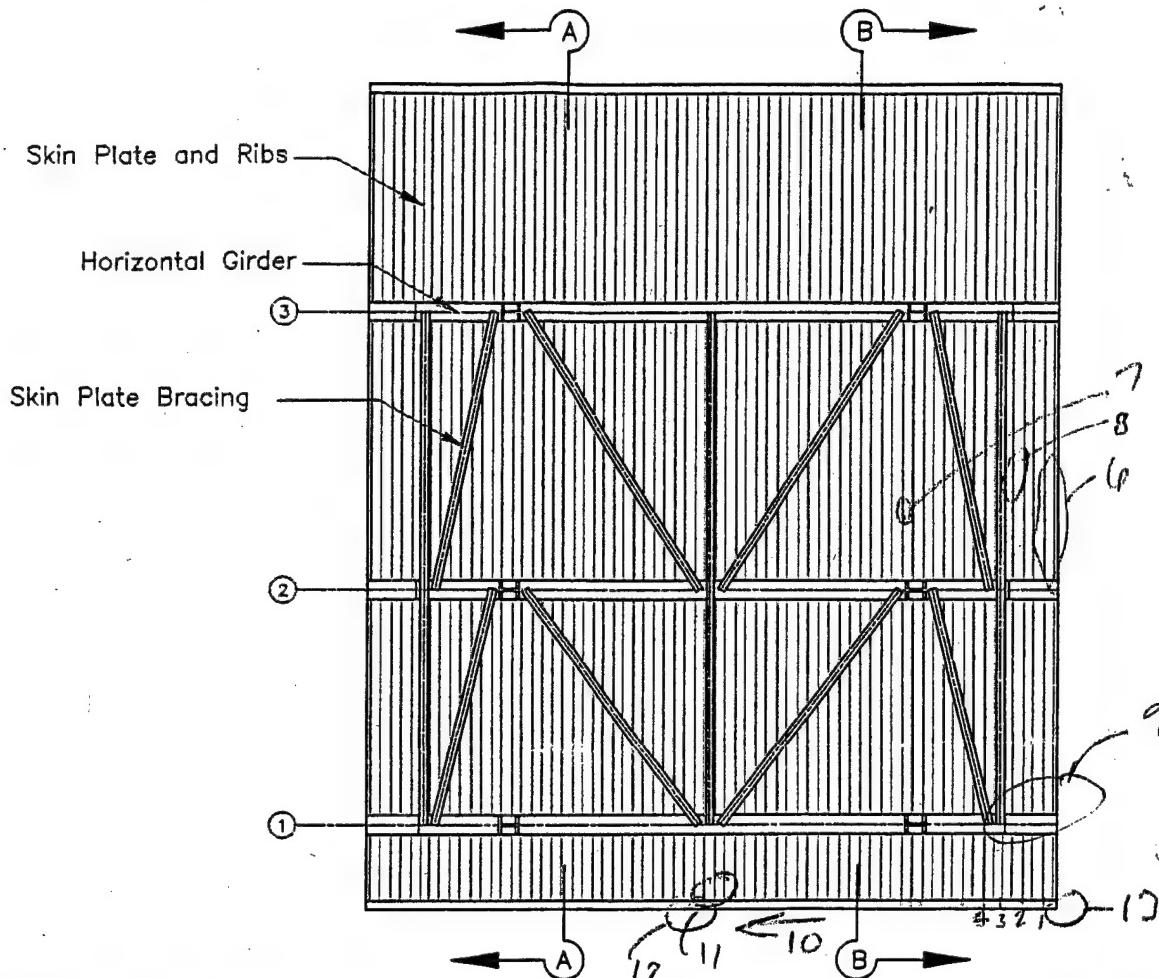


Member	Type	Depth d		Web t_w		Flange(s)			
		Plan (in)	Measured (in)						
Strut 3	14 WF 202	15 5/8	15 7/8	15/16		15 3/4	15 3/4	1 1/2	1 7/16
Strut 2	14 WF 342	17 1/2	17 1/2	1 9/16		16 3/8	16 3/8	2 7/16	2 7/16
Strut 1	14 WF 398	18 1/4	18 1/4	1 13/16		16 5/8	16 5/8	2 13/16	2 13/16
Brace A	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8
Brace B	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8
Brace C	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8
Brace D	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8
Brace E	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8
Brace F	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8
Brace G	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8
Brace H	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 3/4	3/8	3/8
Brace J	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 3/4	3/8	3/8
Brace K	14 WF 30	13 7/8	13 7/8	5/16		6 3/4	6 3/4	3/8	3/8
Brace L	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8
Brace M	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8
Brace N	14 WF 30	13 7/8	13 15/16	5/16		6 3/4	6 3/4	3/8	3/8

14. Typ Debris on gate

15, 16 Water on 2nd strut from drain above

Gate No. 8 Downstream Elevation



NOTE: ENTIRE GATE is Peeling w/ light Rust. There is evidence of new paint on GATE SELF FACE PH.

Member	Type	Depth d		Web t _w		Flange - End			
		Plan (in)	Measured (in)	Plan (in)	Measured (in)	Plan (in)	Measured (in)	Plan (in)	Measured (in)
Horiz. Girder 3	PL Girder	49 3/4	49 3/4	7 1/16	7 1/16	16	16	7/8	7/8
Horiz. Girder 2	PL Girder	60 1/2	60 1/2	3/4	3/4	16 1/2	16 1/2	1 1/4	1 1/4
Horiz. Girder 1	PL Girder	60 1/2	60 1/2	1	1 1/16	16 1/2	16 7/16	1 1/4	1 1/4
Purlins	ST 10 WF 31	10 1/2	10 1/2	13/32	13/32	8 1/4	8 1/4	5/8	9/16
Skin Plate Bracing	ST 7 WF 15	7	7	1/4	1/4	6 3/4	6 3/4	3/8	3/8

6. Far Left Purlin mineral Deposits & Light Rust.

7. Purlin Web Bent.

8. Grinding Marks Around welds (Typ.)

9. Brace Plts w/ Debris and evidence of Standing H₂O

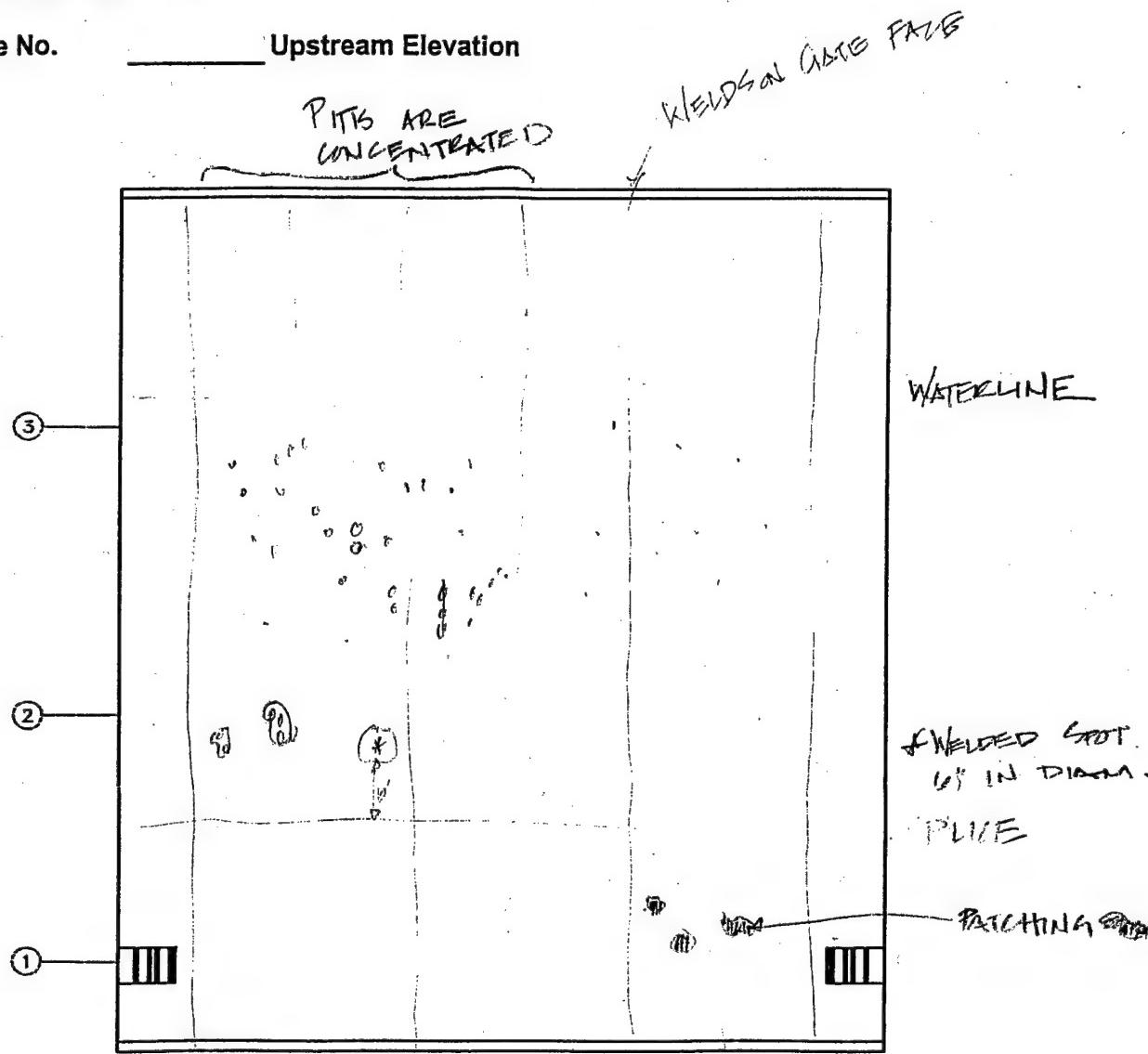
10. Along Bot Seal

11. Muck @ Bot. Plt.

12. leak @ center of gate

13. leak @ LEFT CORNER

Gate No. _____ Upstream Elevation



- SINK PITS HAVE BEEN FILLED W/ WELD MATERIAL
- REARDOORS SHOULD BE REFERENCED
- OTHER PITS ARE EXISTING
- SMALL PITS
- WEAR PLATES LOOK OK

HDR Engineering, Inc.
Corp of Engineers - Walla Walla
Little Goose Dam

Inspection Team SMP TDB HAY AMA
Weather OVERCAST 50

Date 10/10/00
Sheet 5

Gate No.

E

Operation and Trunnion Measurements

Racking Measurements: Bottom of Gate and Spillway

LEFT	RIGHT
45'	45"

Transverse Trunnion Hub Movement, No Load on Gate: Closed-Open-Closed

LEFT		
	Inside Outside (pier)	
Initial Gate Closed	24/32	14/32
Gate Full Open	23/32	16/32
Final Gate Closed	23/32	15/32

RIGHT		
	Inside Outside (pier)	
Initial Gate Closed	16/32	19/32
Gate Full Open	15/32	19/32
Final Gate Closed	16/32	19/32

3-D Trunnion Hub Movements - Unloaded vs. Loaded

LEFT		
	No Load Void Dry Full Load Void Full	
Vertical	+0.0008	+0.0008
US / DS	+0.0020	+0.0315
Transverse	23/32	15/32
	Inside	Outside
	23/32	15/32
	Inside	Outside

RIGHT		
	No Load Void Dry Full Load Void Full	
Vertical	0.0000	-0.0010
US / DS	+0.0010	+0.0250
Transverse	16/32	19/32
	Inside	Outside
	16/32	19/32
	Inside	Outside

HDR Engineering, Inc.
Corp of Engineers - Walla Walla
Little Goose Dam

Inspection Team K & N
Weather RAIN

Date 10/10/00
Sheet 1 OF 1

Gate No. 1

Hoist Amperage Readings

Name Plate Data	REULAND		
Horsepower	15		
Voltage	440/3 PHASE/60 HZ	DESIGN C	
Current	19.00	1760 RPM	
Type	A000		
Frame	284U		

Amperage		Loaded		Unloaded	
		Opening	Closing	Opening	Closing
Starting		89.6	84.0	87.6	72.0
Running	Phase A	11.8	6.7	10.9	6.6
	Phase B	12.1	6.4	10.8	6.4
	Phase C	11.8	6.7	10.7	6.6

HDR Engineering, Inc.
Corp of Engineers - Walla Walla
Little Goose Dam

Inspection Team K&N
Weather RAIN

Date 10/10/00
Sheet 1 OF 1

Gate No. 2

Hoist Amperage Readings

Name Plate Data	<u>REULAND</u>	
Horsepower	15	
Voltage	<u>440/3 PHASE/60 HZ</u>	<u>DESIGN C</u>
Current	19.00	1760 RPM
Type	A000	
Frame	284U	

Amperage		Loaded		Unloaded	
		Opening	Closing	Opening	Closing
Starting		103.0	93.6	92.8	81.6
Running	Phase A	12.1	6.8	10.9	6.7
	Phase B	12.0	6.7	10.8	6.4
	Phase C	12.0	6.8	10.8	6.8

BEARING NOISE IN MOTOR

HDR Engineering, Inc.
Corp of Engineers - Walla Walla
Little Goose Dam

Inspection Team K & N
Weather RAIN

Date 10/10/00
Sheet 1 OF 1

Gate No. 3

Hoist Amperage Readings

Name Plate Data	REULAND	
Horsepower	15	
Voltage	440/3 PHASE/60 HZ	DESIGN C
Current	19.00	1760 RPM
Type	A000	
Frame	284U	

Amperage	Loaded		Unloaded	
	Opening	Closing	Opening	Closing
Starting	101.0	94.0	96.0	85.6
Running	Phase A	10.8	6.3	10.9
	Phase B	12.0	6.4	11.1
	Phase C	12.0	6.4	10.7

BAD TAPE ON MOTOR LEAD WIRES

HEATER WIRES FRAYED

HDR Engineering, Inc.
Corp of Engineers - Walla Walla
Little Goose Dam

Inspection Team K & N
Weather RAIN

Date 10/10/00
Sheet 1 OF 1

Gate No. 5

Hoist Amperage Readings

Name Plate Data	<u>REULAND</u>	
Horsepower	15	
Voltage	440/3 PHASE/60 HZ	DESIGN C
Current	19.00	1760 RPM
Type	A000	
Frame	284U	

Amperage		Loaded		Unloaded	
		Opening	Closing	Opening	Closing
	Starting	93.0	88.0	84.8	78.0
Running	Phase A	12.3	6.0	11.6	6.2
	Phase B	12.4	6.2	11.6	6.3
	Phase C	12.5	6.2	11.6	6.2

HDR Engineering, Inc.
Corp of Engineers - Walla Walla
Little Goose Dam

Inspection Team K & N

Date 10/10/00
Sheet 1 OF 1

Gate No. 6

Hoist Amperage Readings

Name Plate Data	GE
Horsepower	15
Voltage	460/3 PHASE/60 HZ
Current	19.20
	DESIGN B
Current	1760 RPM
Type	5KW254SE205C
Frame	254T

Amperage		Loaded		Unloaded	
		Opening	Closing	Opening	Closing
Starting		104.0	99.2	99.2	80.0
Running	Phase A	13.7	7.6	13.3	6.6
	Phase B	13.6	7.4	13.6	6.4
	Phase C	13.4	7.4	13.4	6.5

ADJUSTED BARKE UNIT

HDR Engineering, Inc.
Corp of Engineers - Walla Walla
Little Goose Dam

Inspection Team K & N
Weather 60° WARM DAY

Date 10/17/00
Sheet 1 OF 1

Gate No. 7

Hoist Amperage Readings

Name Plate Data	<u>REULAND</u>	
Horsepower	15	
Voltage	440/3 PHASE/60 HZ	DESIGN C
Current	19.00	1760 RPM
Type	A000	
Frame	284U	

Amperage		Loaded		Unloaded	
		Opening	Closing	Opening	Closing
Starting		11.5	86.0	102.0	80.0
Running	Phase A	11.8	6.7	12.2	6.1
	Phase B	11.6	6.1	11.4	6.2
	Phase C	9.2	6.3	11.5	6.1
	Total	32.6	29.1	33.9	27.4

MOTOR BEARINGS GONE

HDR Engineering, Inc.
Corp of Engineers - Walla Walla
Little Goose Dam

Inspection Team K & N
Weather DAMP

Date 10/10/00
Sheet 1 OF 1

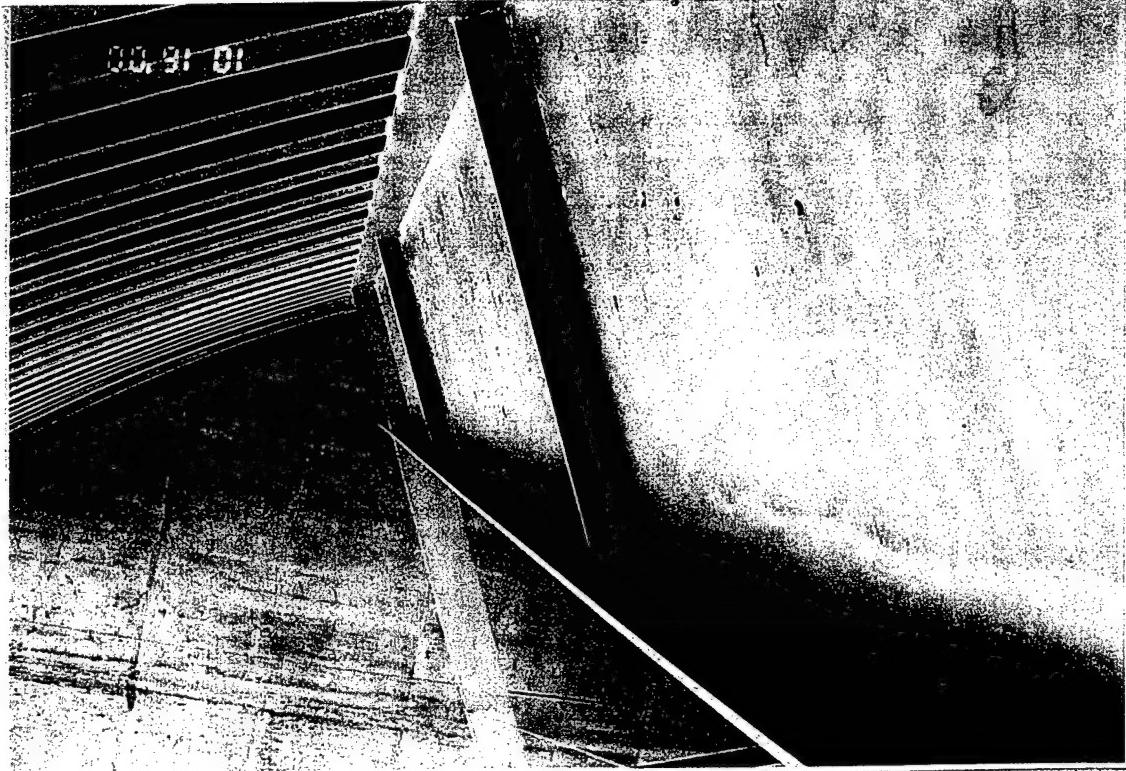
Gate No. 8

Hoist Amperage Readings

Name Plate Data REULAND
Horsepower 15
Voltage 440/3 PHASE/60 HZ DESIGN C
Current 19.00 1760 RPM
Type A000
Frame 284U

Amperage	Loaded		Unloaded	
	Opening	Closing	Opening	Closing
Starting	95.2	84.0	84.0	74.0
Running	Phase A	11.8	5.8	12.2
	Phase B	10.8	5.5	12.0
	Phase C	11.0	5.7	11.8

00-91-01

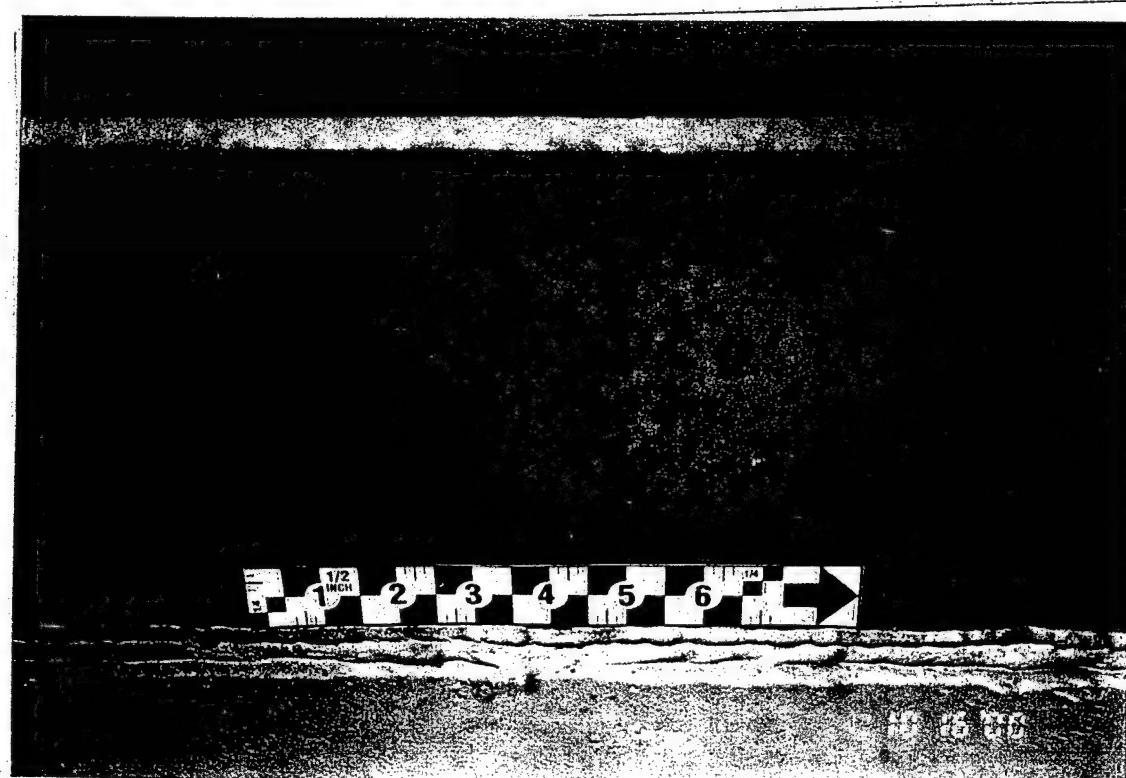


Little
Goose
Dam

10/16/00

1-1

Gate 1
Top horizontal girder looking toward
right frame, typical.



Little
Goose
Dam

10/16/00

1-2

Gate 1
Downstream surface of skin plate.
Light corrosion, typical.

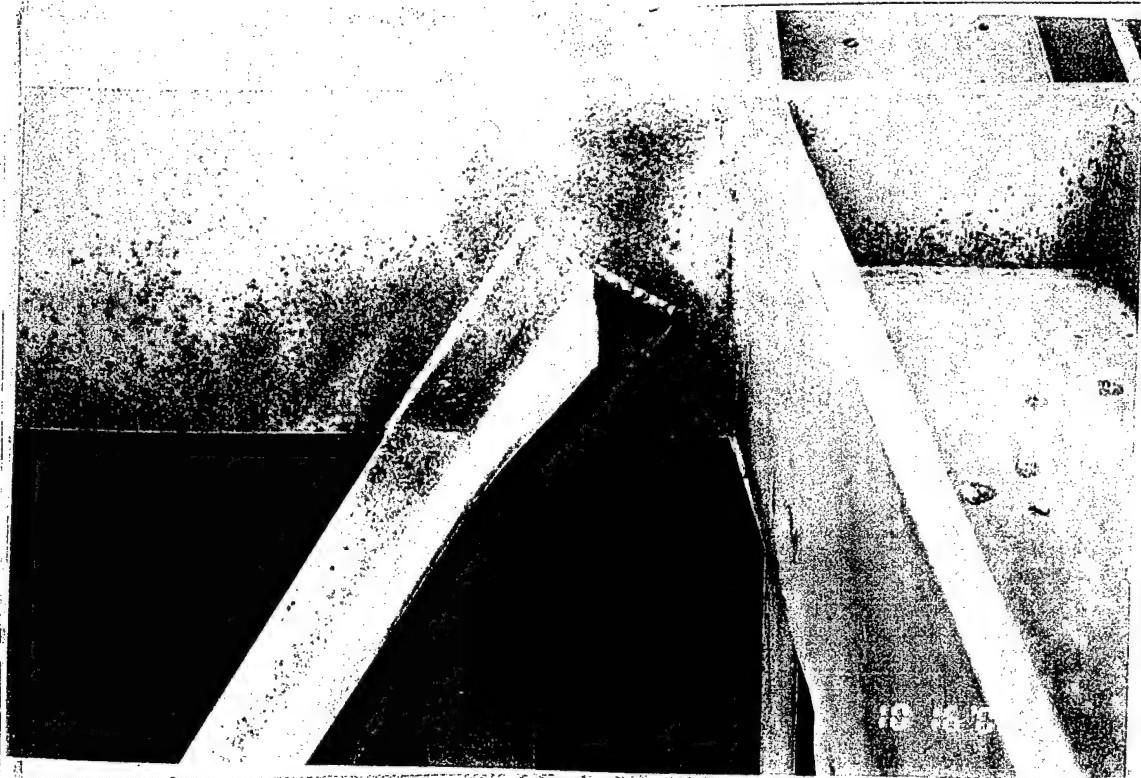


Little
Goose
Dam

10/16/00

1-3

Gate 1
Skin plate at center of gate, 5' above
top horizontal girder. Apparent
previous weld and grind repair.



Little
Goose
Dam

10/16/00

1-4

Gate 1
Top horizontal girder, downstream
flange at connection to left top radial
strut. Light corrosion.

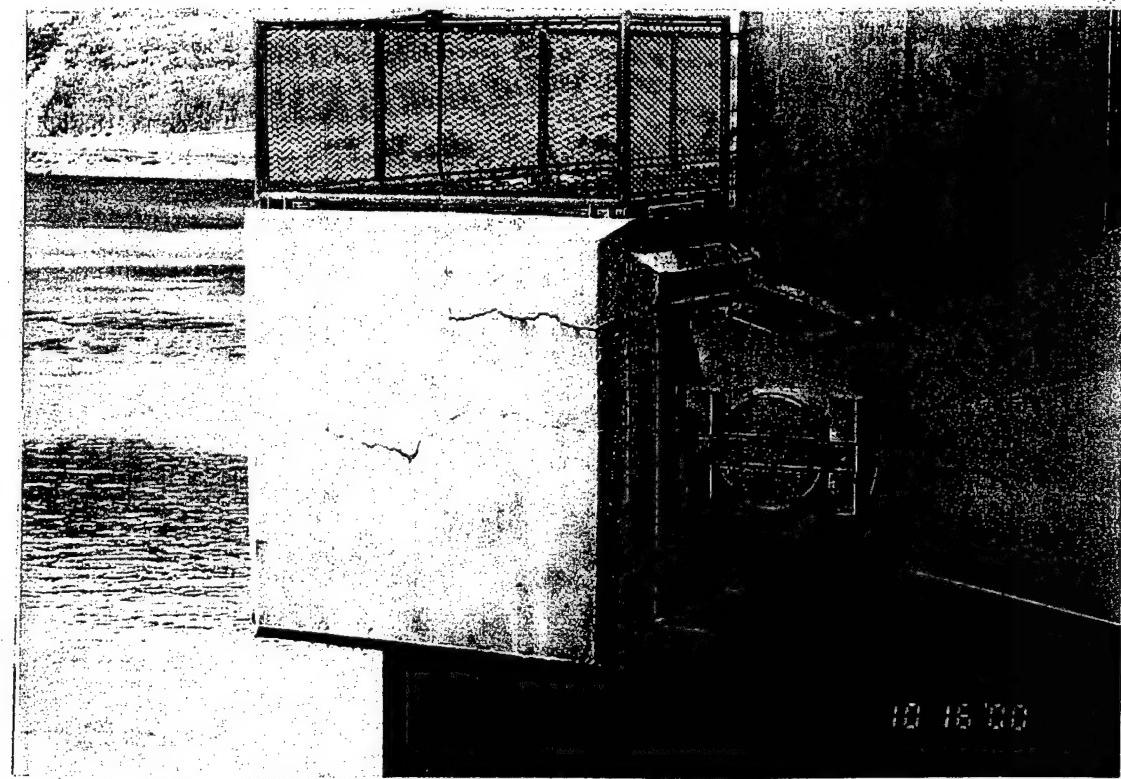
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Little
Goose
Dam

10/16/00

1-5

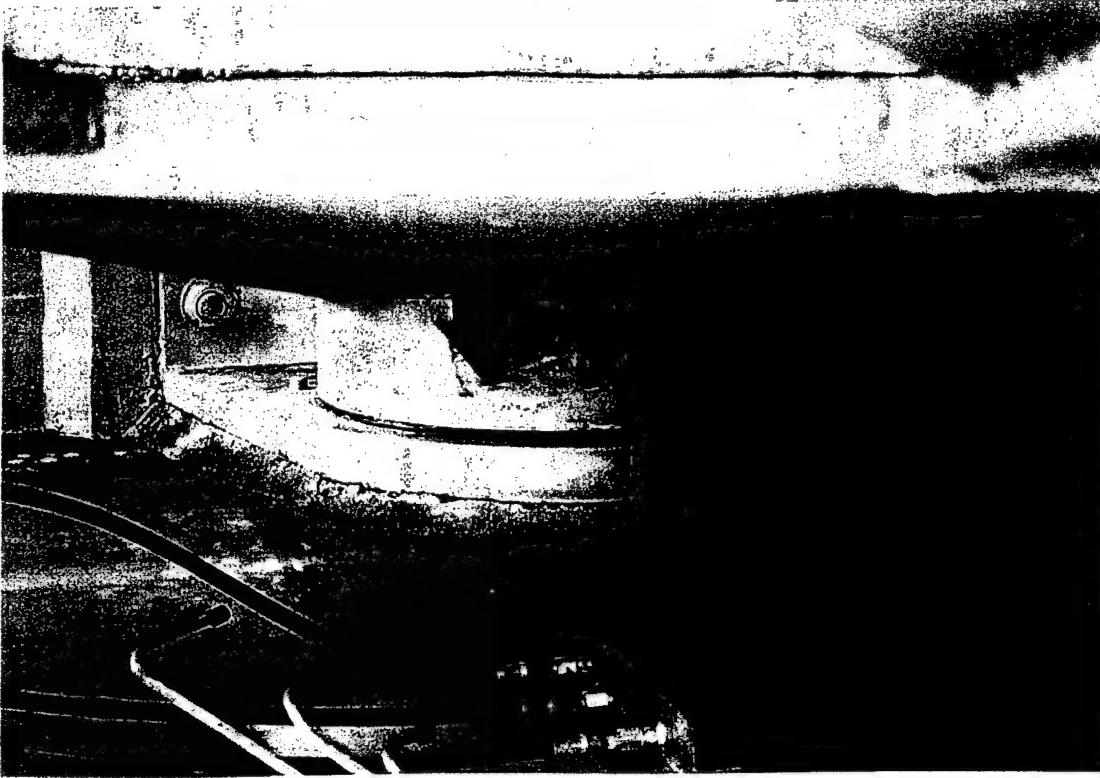


Little
Goose
Dam

10/16/00

1-6

Gate 1
Right trunnion block. Light cracking
in concrete.

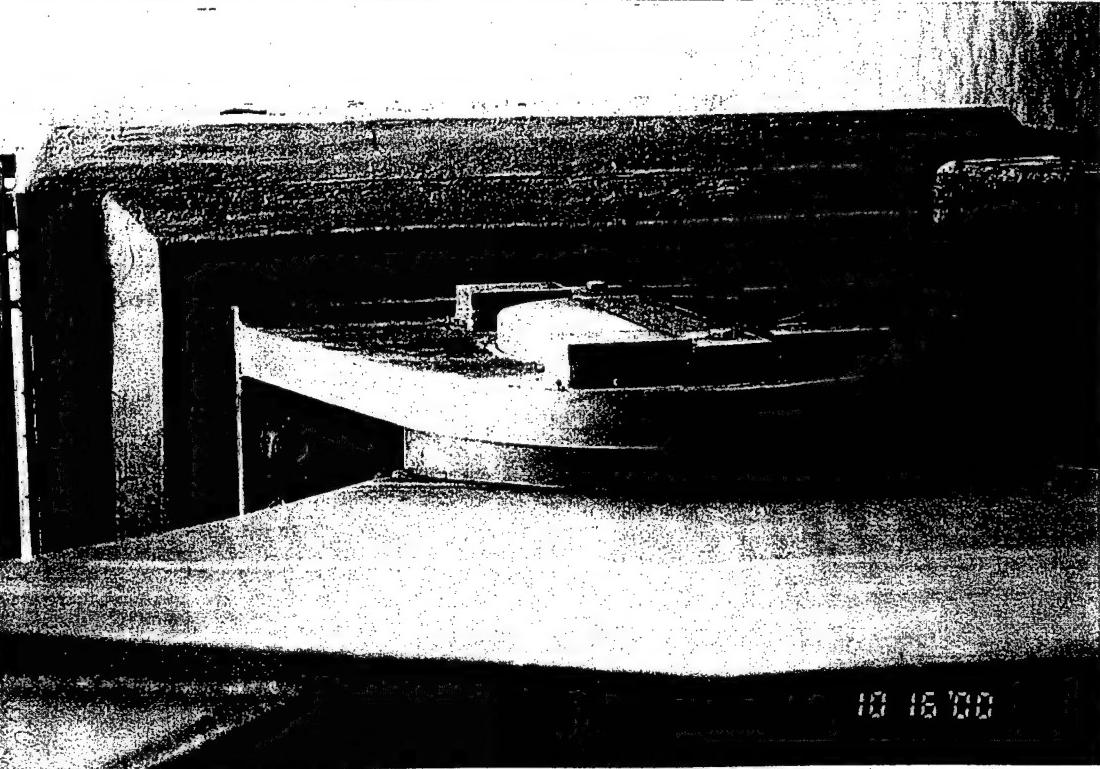


Little
Goose
Dam

Gate 1
Outside of left trunnion and trunnion
yoke, typical.

10/16/00

1-7

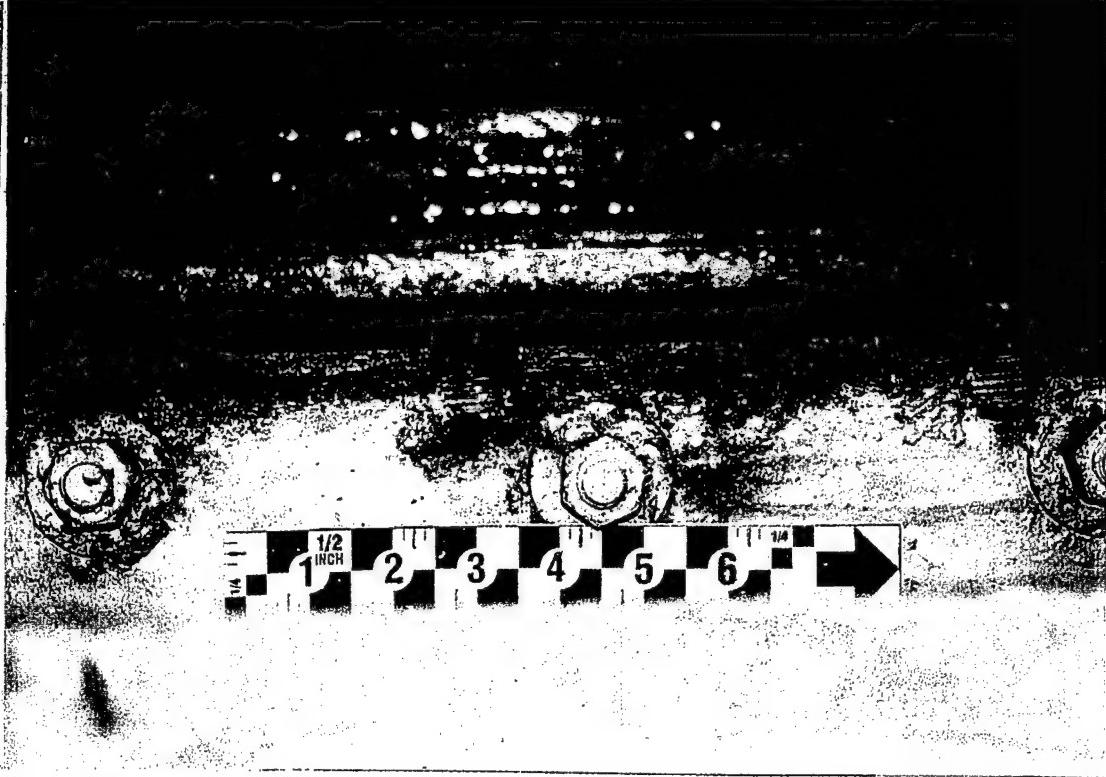


Little
Goose
Dam

Gate 1
Inside of left trunnion and yoke,
typical.

10/16/00

1-8



Little
Goose
Dam

10/16/00

1-9

Gate 1

Side seal, typical. Light to moderate corrosion on skin plate, side seal angle, nuts and bolts.



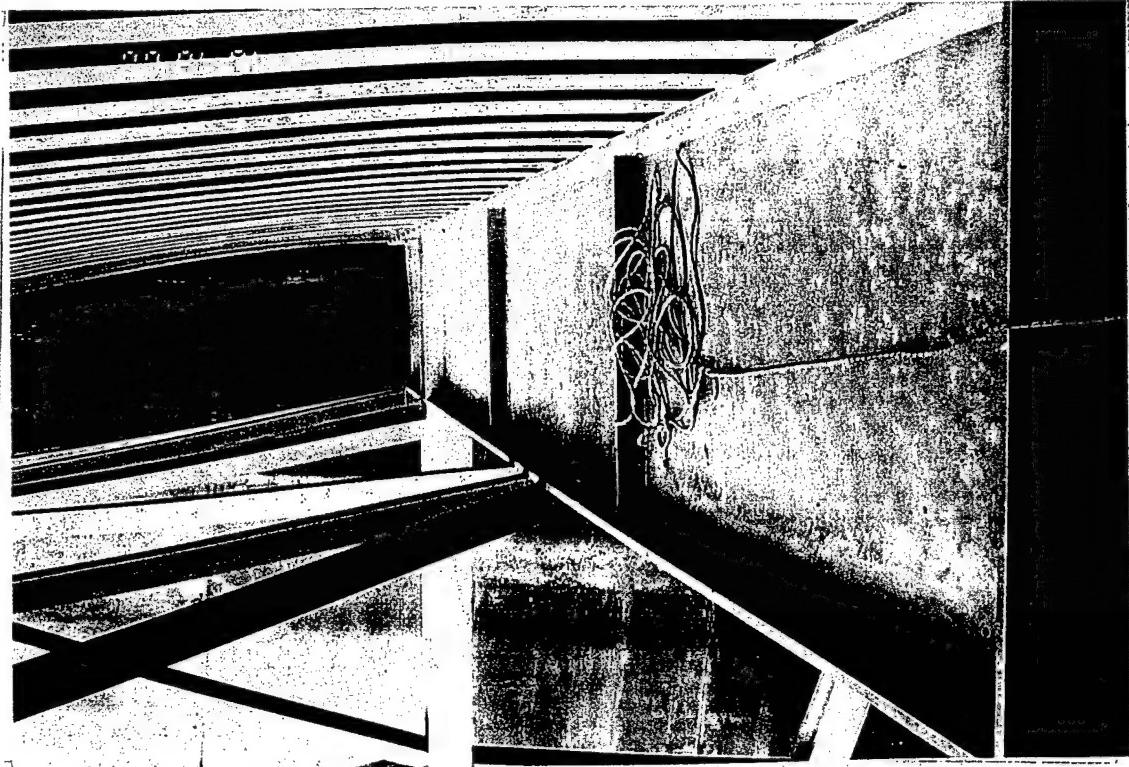
Little
Goose
Dam

10/16/00

1-10

Gate 1

Side seal, typical. Light to moderate corrosion on skin plate, side seal angle, nuts and bolts.

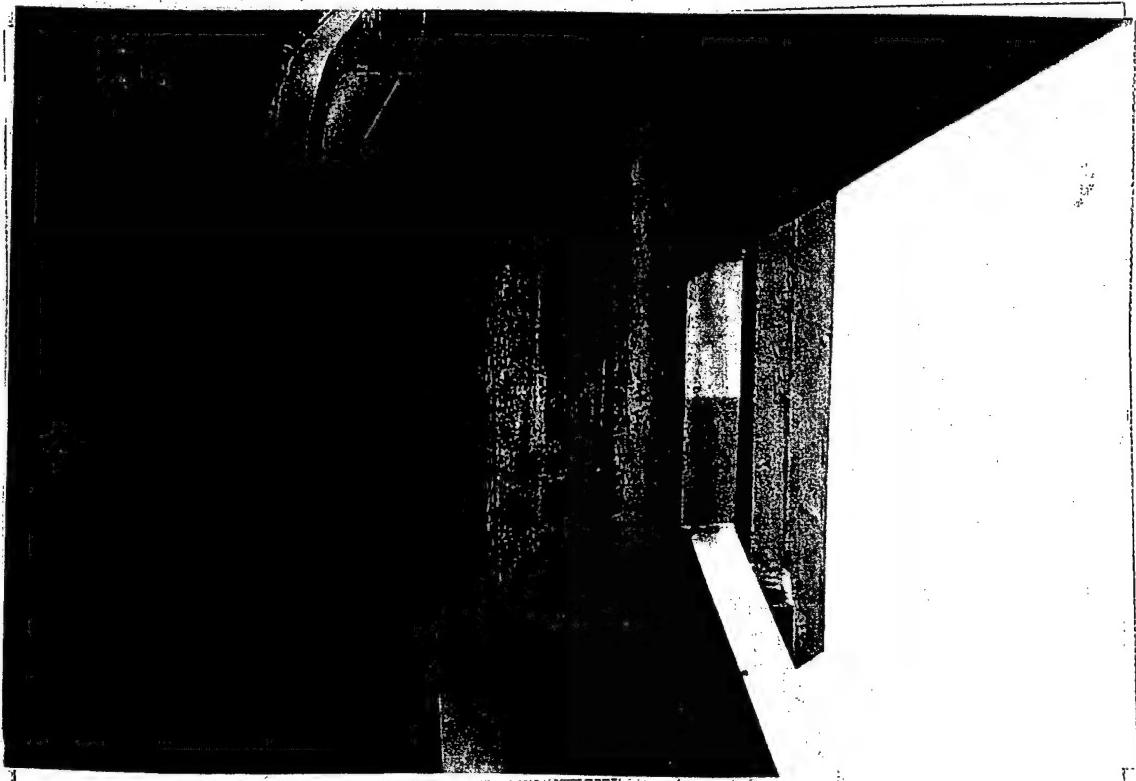


Little
Goose
Dam

10/16/00

I-11

Gate 1
Middle horizontal girder looking
toward right frame, typical.

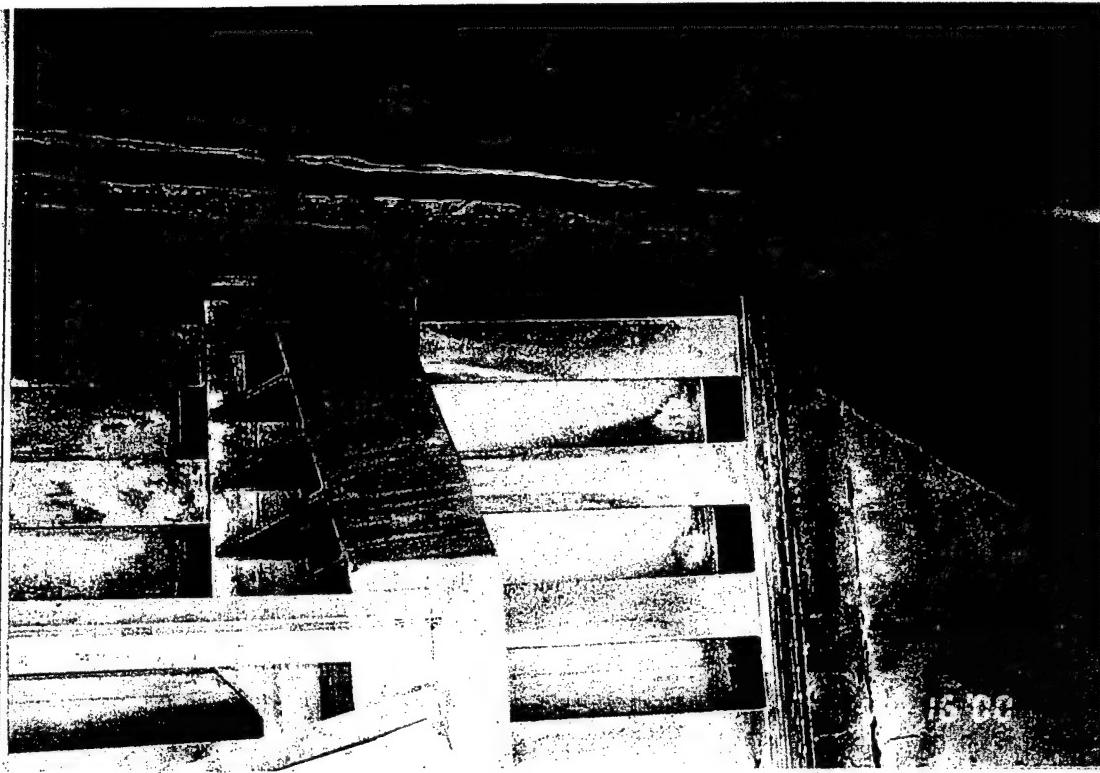


Little
Goose
Dam

10/16/00

I-12

Gate 1
Closure plate inside left trunnion.
Light corrosion.



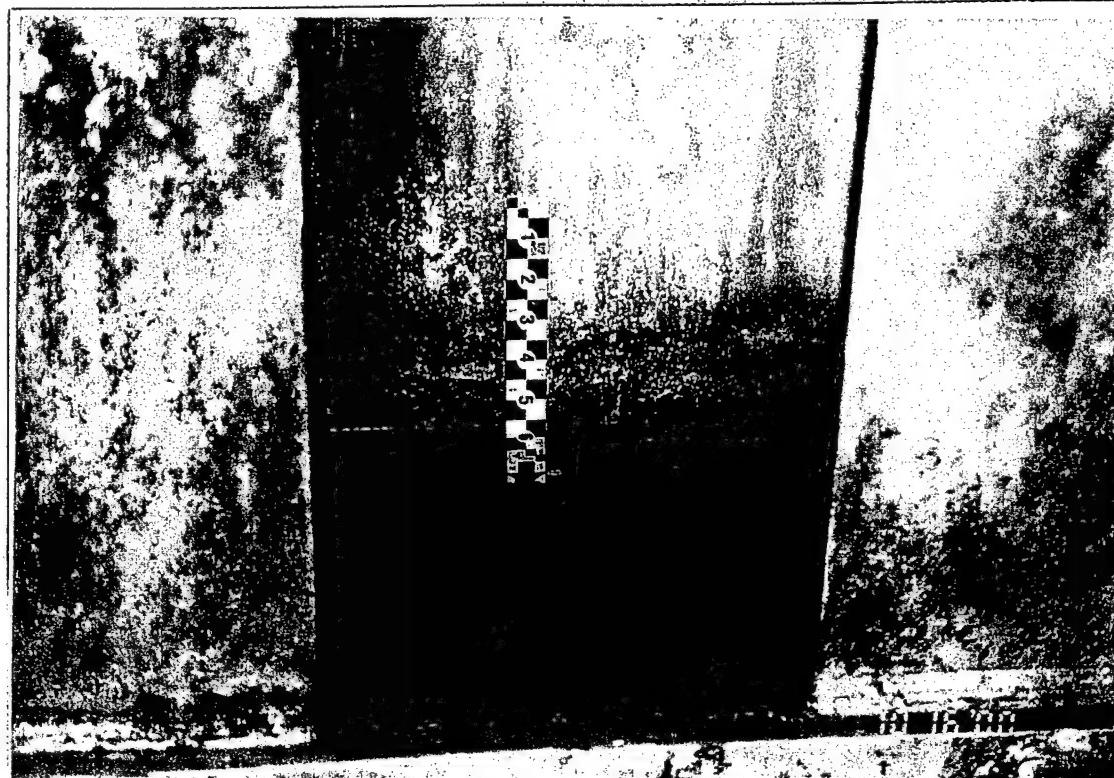
Little
Goose
Dam

Gate 1

Corner leak at bottom left side of
gate.

10/16/00

I-13



Little
Goose
Dam

Gate 1

Bottom seal closure plate looking
upstream. Standing water between
closure plate, purlin webs and
skinplate. Typical.

10/16/00

I-14



Little
Goose
Dam
10/16/00

1-15

Gate 1
Bottom horiz. girder. Standing
water, no drainage between multiple
stiffeners, typical.



Little
Goose
Dam
10/16/00

1-16

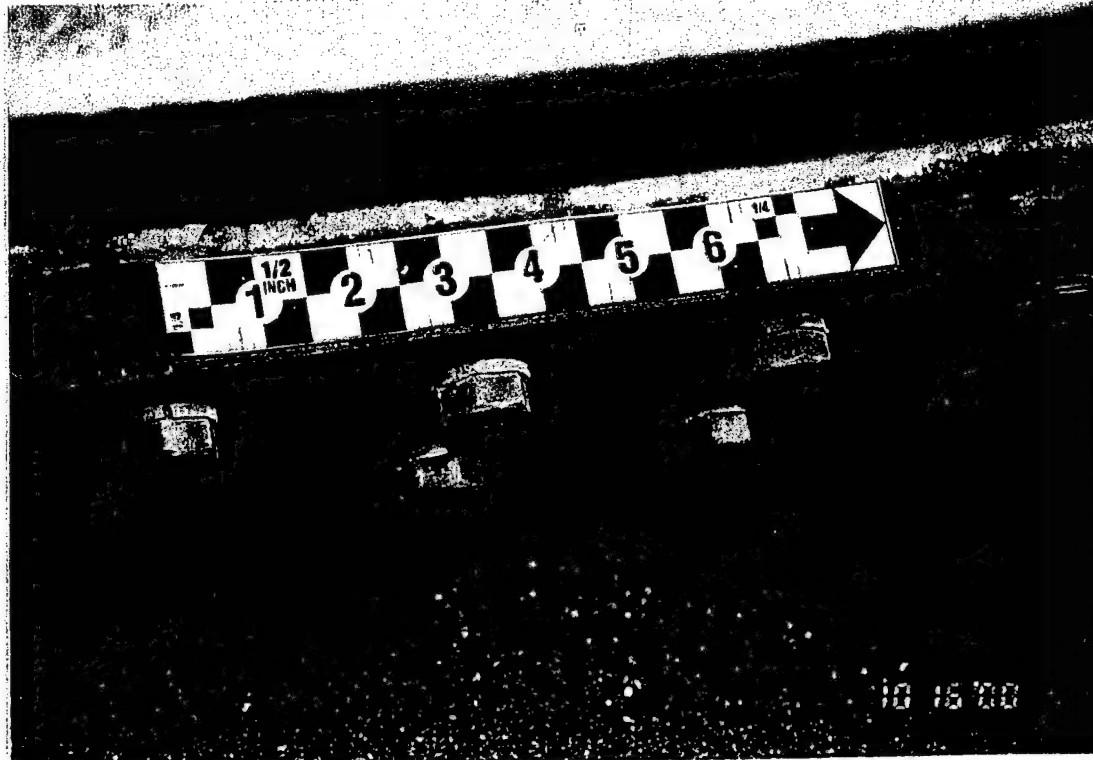
Gate 1
Bottom horiz. girder. Standing
water, no drainage between multiple
stiffeners, typical.

Little
Goose
Dam
10/16/00

Gate 1

Bottom seal closure plate looking upstream. Standing water between closure plate, purlin webs and skinplate. Typical.

1-17



10 16 00

Little
Goose
Dam

Gate 1

Bottom seal keeper plate and embedded bottom seal plate, typical.

10/16/00

1-18



Little
Goose
Dam
10/16/00

1-19

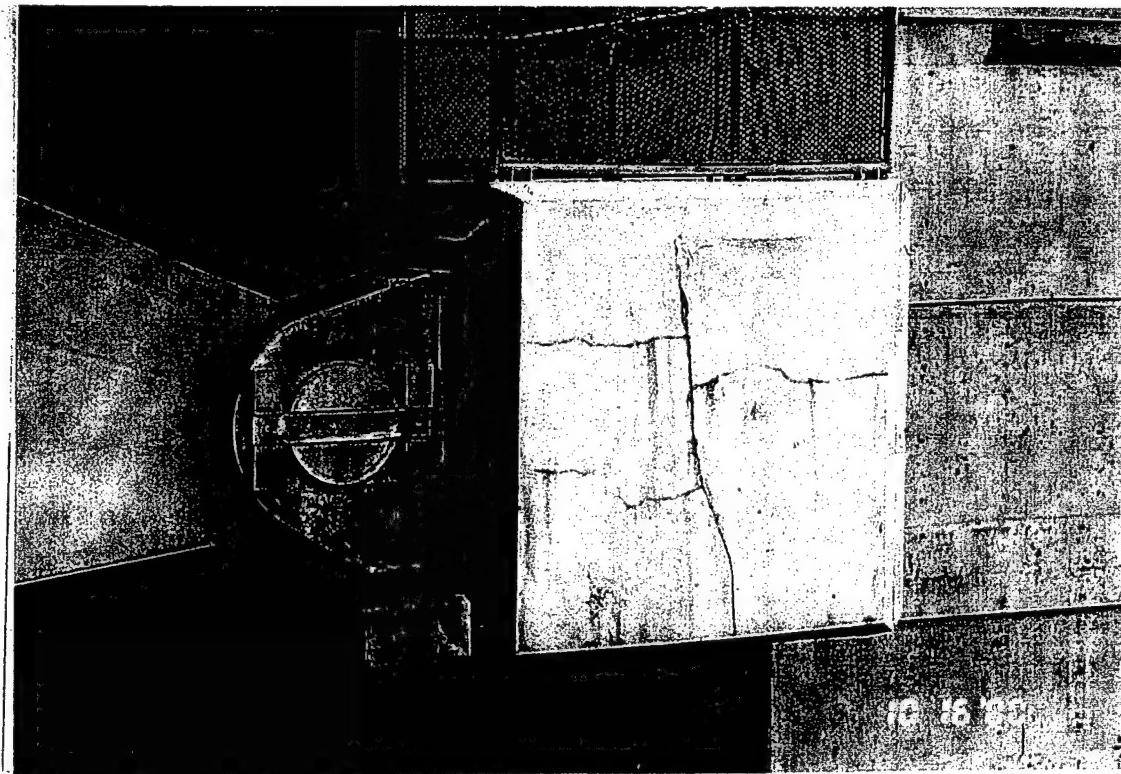
Gate 1
Bottom seal closure plate looking
upstream. Standing water between
closure plate, purlin webs and
skinplate. Typical.



Little
Goose
Dam
10/16/00

1-20

Gate 1
Bottom of bottom horizontal girder
at stiffeners for bottom left radial
strut. Light to moderate corrosion
due to horiz. girder drain hole above.

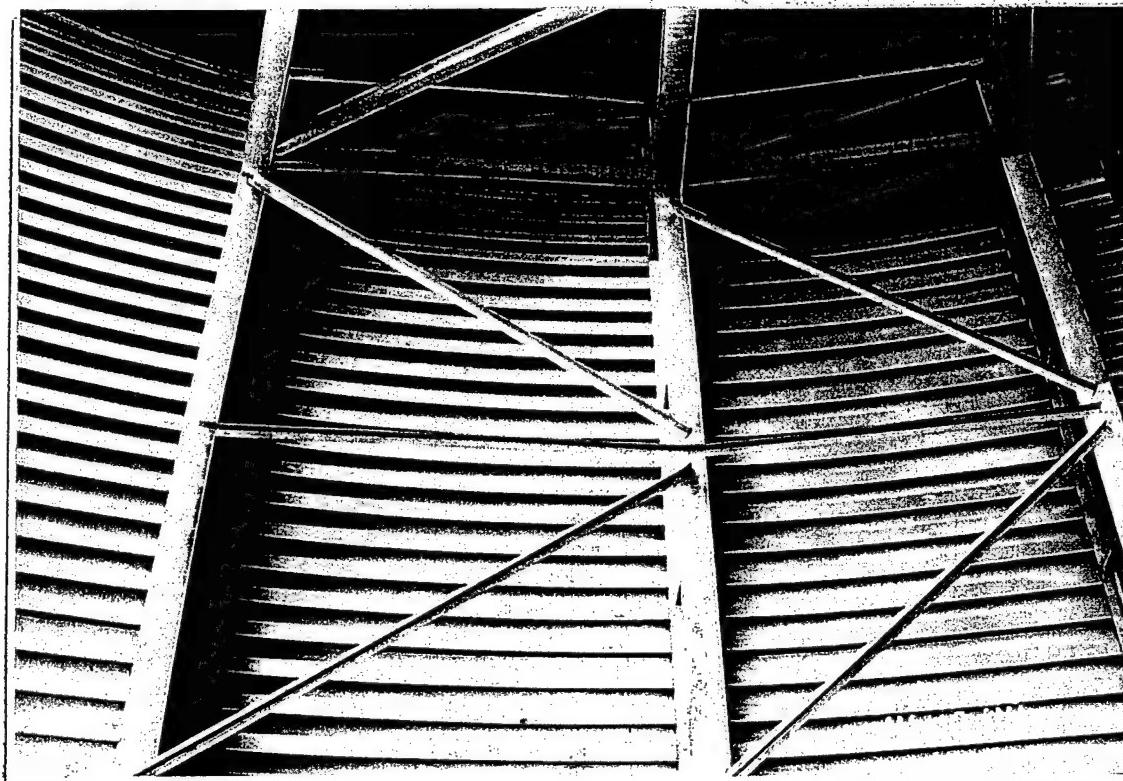


Little
Goose
Dam

Gate 1
Left trunnion block. Light cracking
in concrete.

10/16/00

1-21

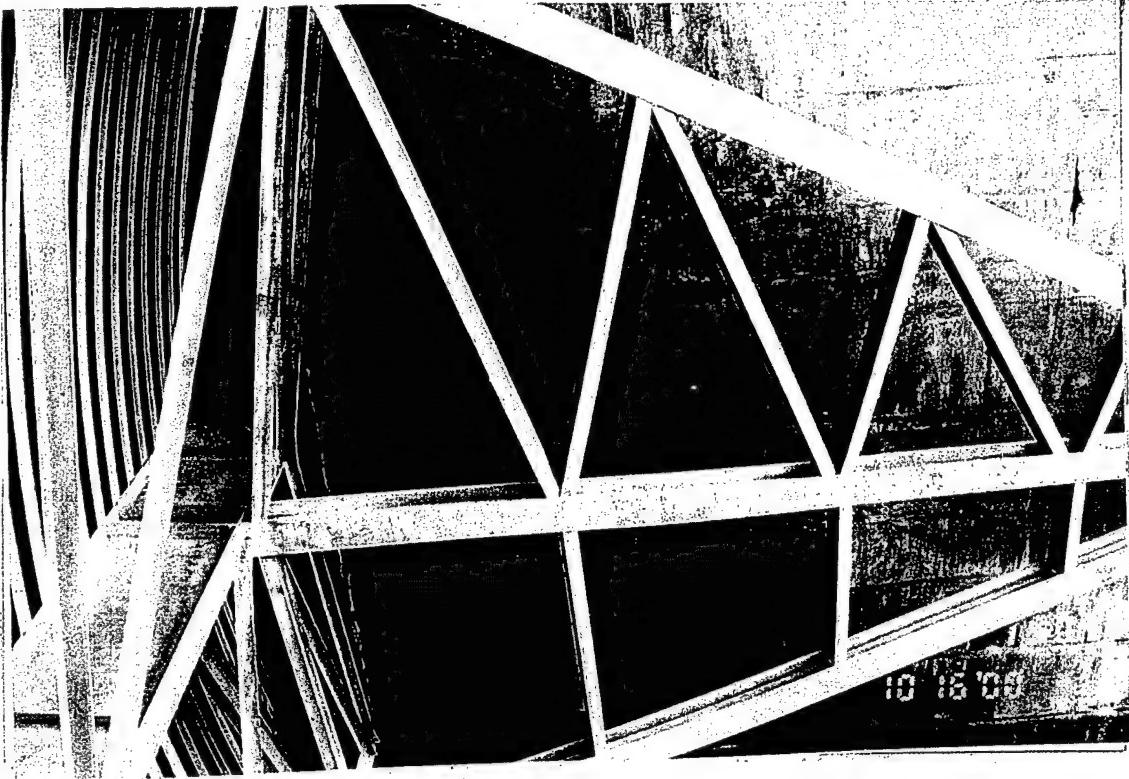


Little
Goose
Dam

Gate 1
Gate face, typical.

10/16/00

1-22

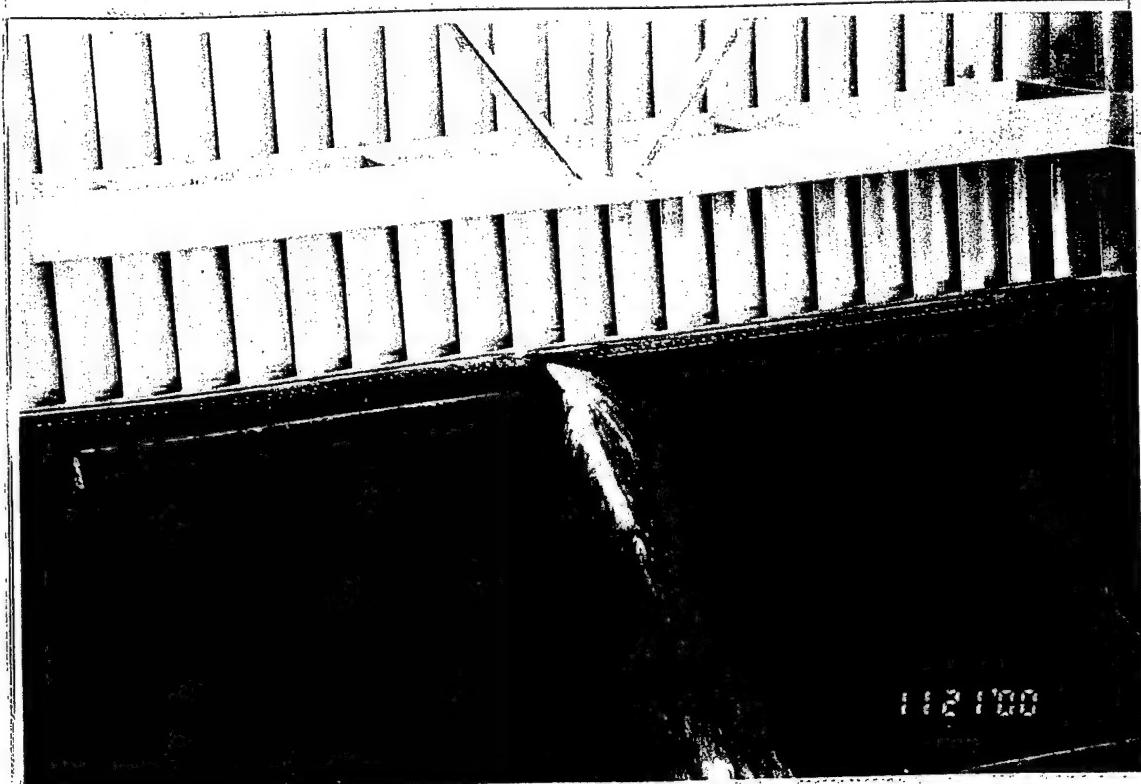


Little
Goose
Dam

10/16/00

1-23

Gate 1
Left frame, typical.



Little
Goose
Dam

11/21/00

1-24

Gate 1
Leak at center construction joint in
spillway monolith.

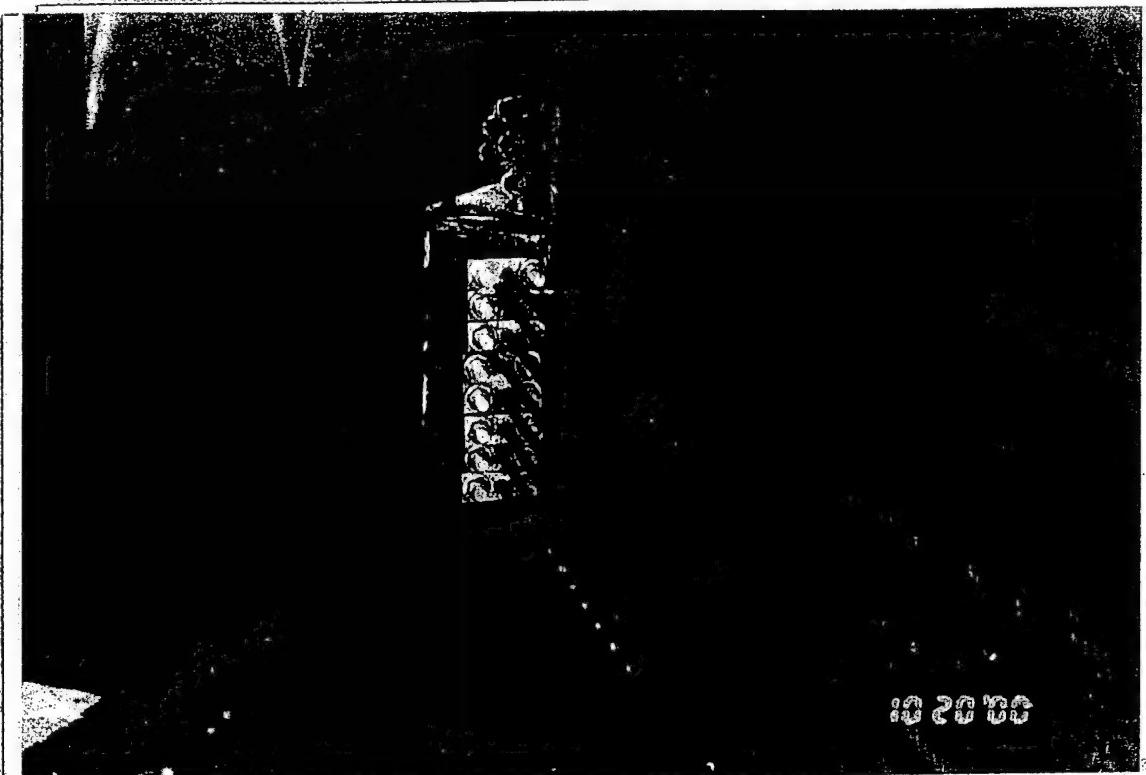


Little
Goose
Dam

Gate 1
Typical condition of skin plate.
Scattered pitting.

10/20/00

1-25



Little
Goose
Dam

Gate 1
Top of hoist connection. Note:
Good condition of stainless steel U-
bolts and socket blocks.

10/20/00



Little
Goose
Dam

10/20/00

1-27

Gate 1
Top of hoist connection. Note:
Good condition of stainless steel U-
bolts and socket blocks.

10 20 '00



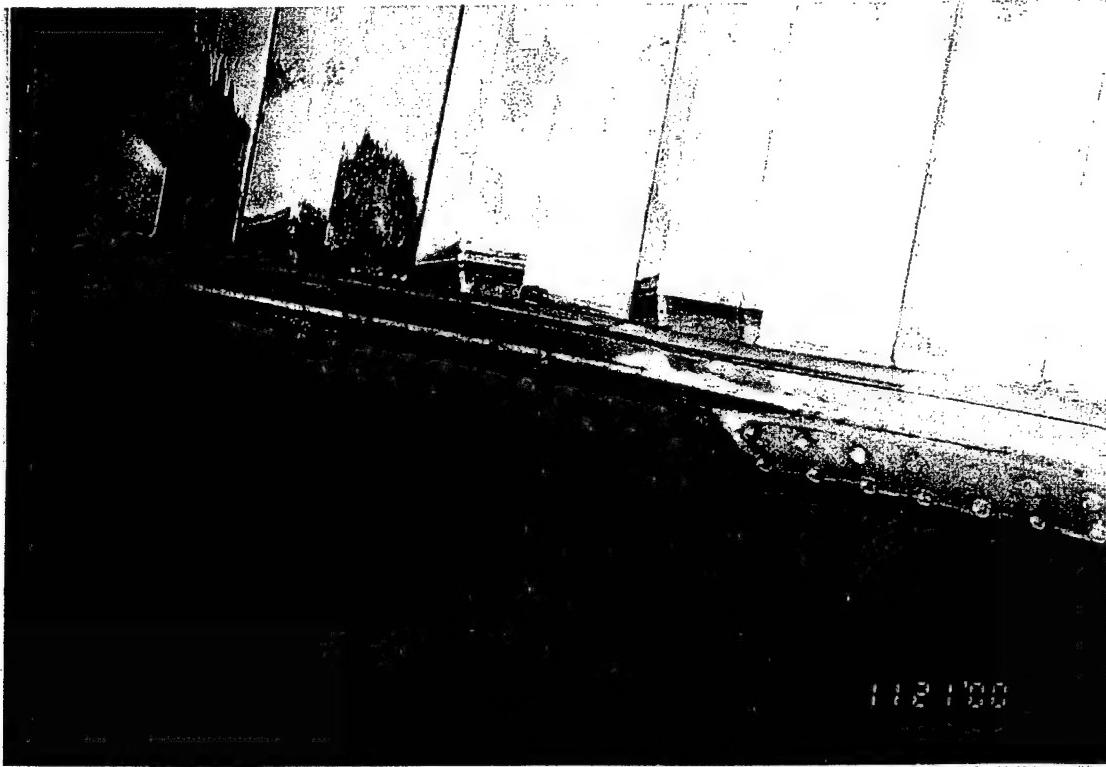
Little
Goose
Dam

10/20/00

1-28

Gate 1
Skin plate pitting, typical.

10 20 '00

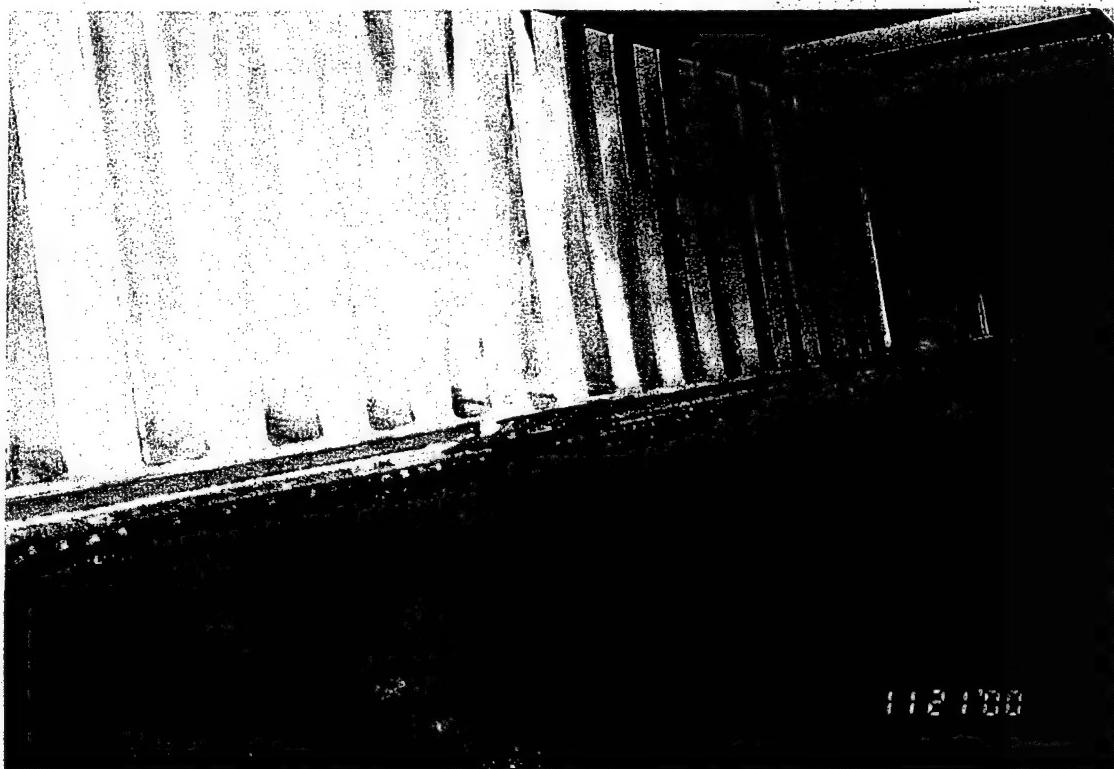


112 100

Little
Goose
Dam
10/20/00

Gate 1
Bottom of right side of gate at 3'
open. Note: Heavy falling water due
to stop log leakage precludes
inspection of hoist connections.

1-29

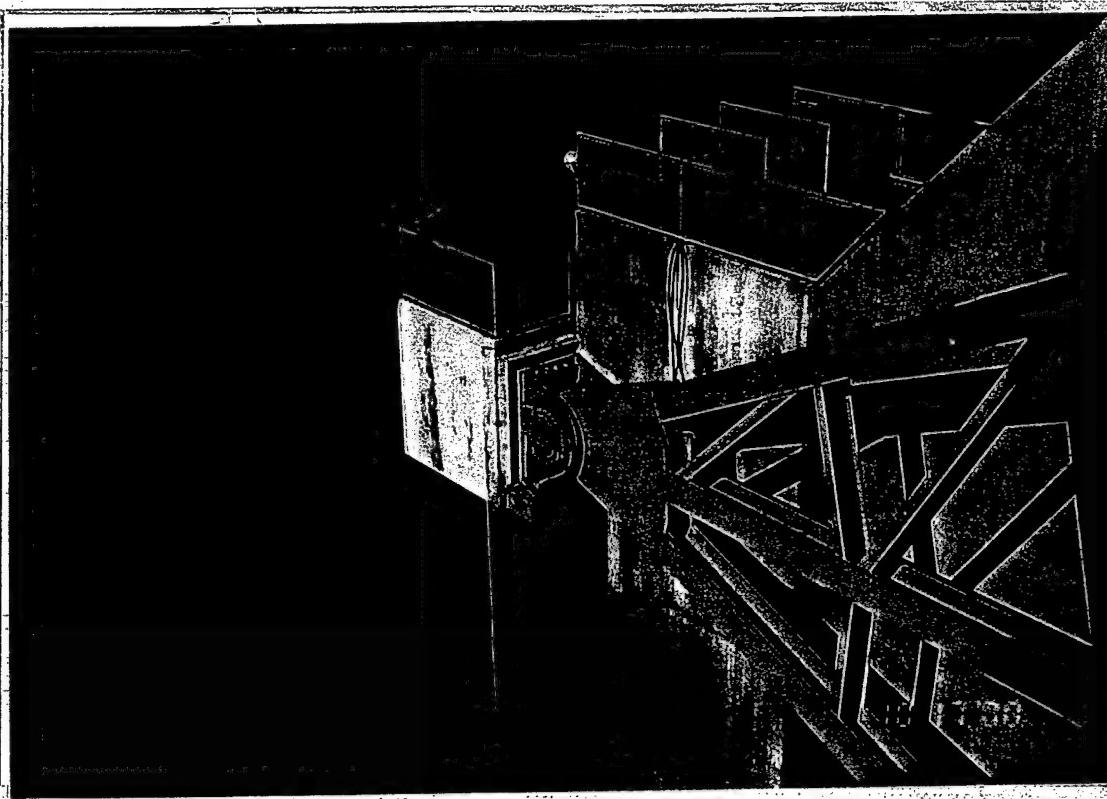


112 100

Little
Goose
Dam
10/20/00

Gate 1
Bottom of left side of gate at 3' open.
Note: Heavy falling water due to
stop log leakage precludes inspection
of hoist connections.

1-30



Little
Goose
Dam

Gate 2
Right frame, typical.

10/17/00

2-1



Little
Goose
Dam

Gate 2
Top of top horizontal girder looking
towards right frame, typical.

10/17/00

2-2

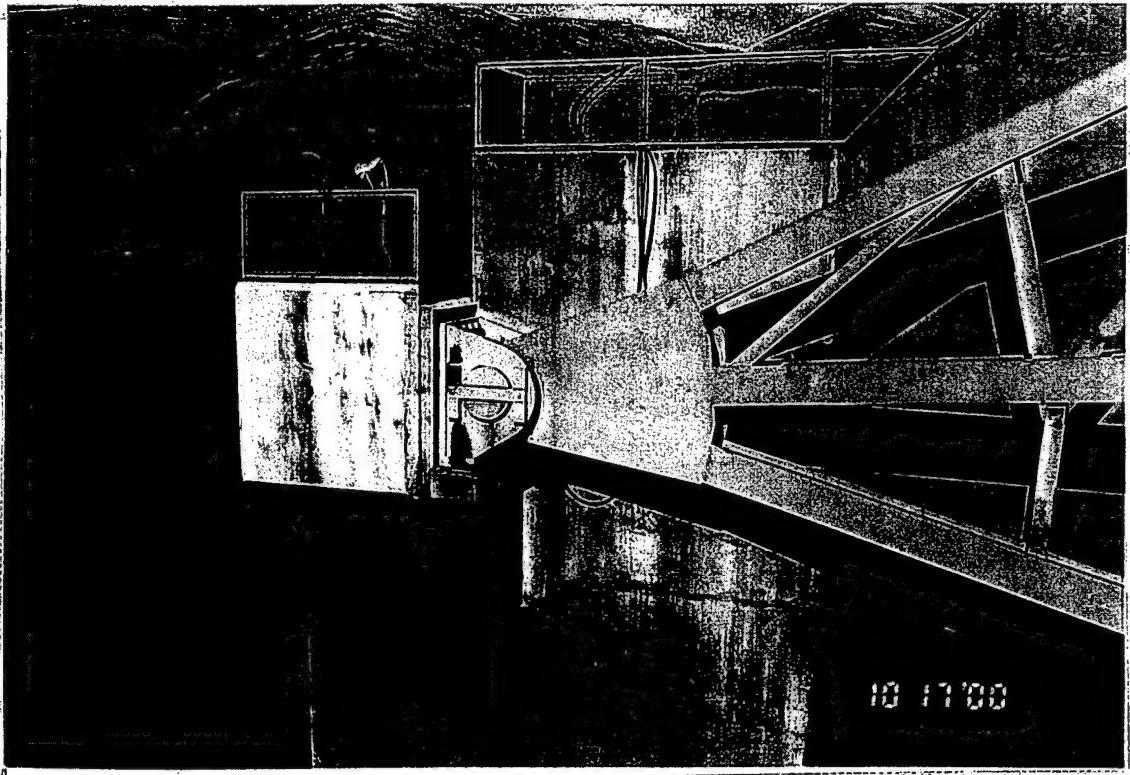


Little
Goose
Dam

10/17/00

2-3

Gate 2
Outside of left trunnion and yoke,
typical.

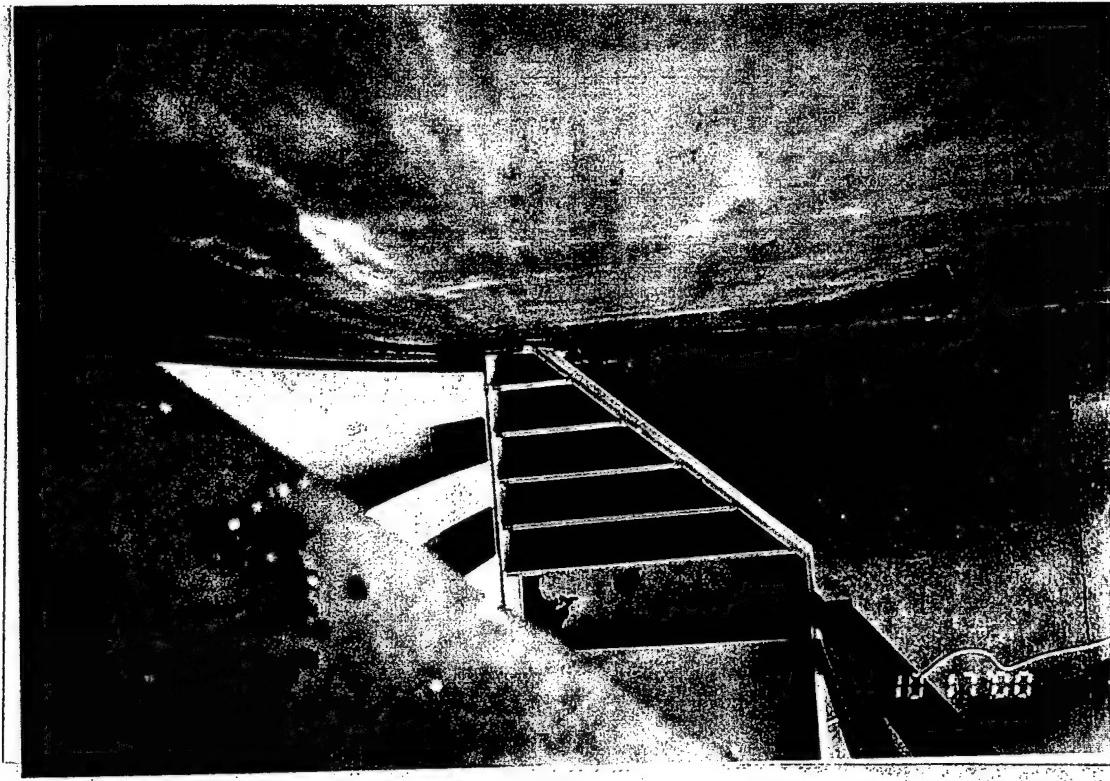


Little
Goose
Dam

10/17/00

2-4

Gate 2
Right trunnion and trunnion block,
typical.



Little
Goose
Dam
10/17/00

Gate 2
Bottom horizontal girder, left end.
Standing water, no drainage between
multiple stiffeners, typical.

2-5

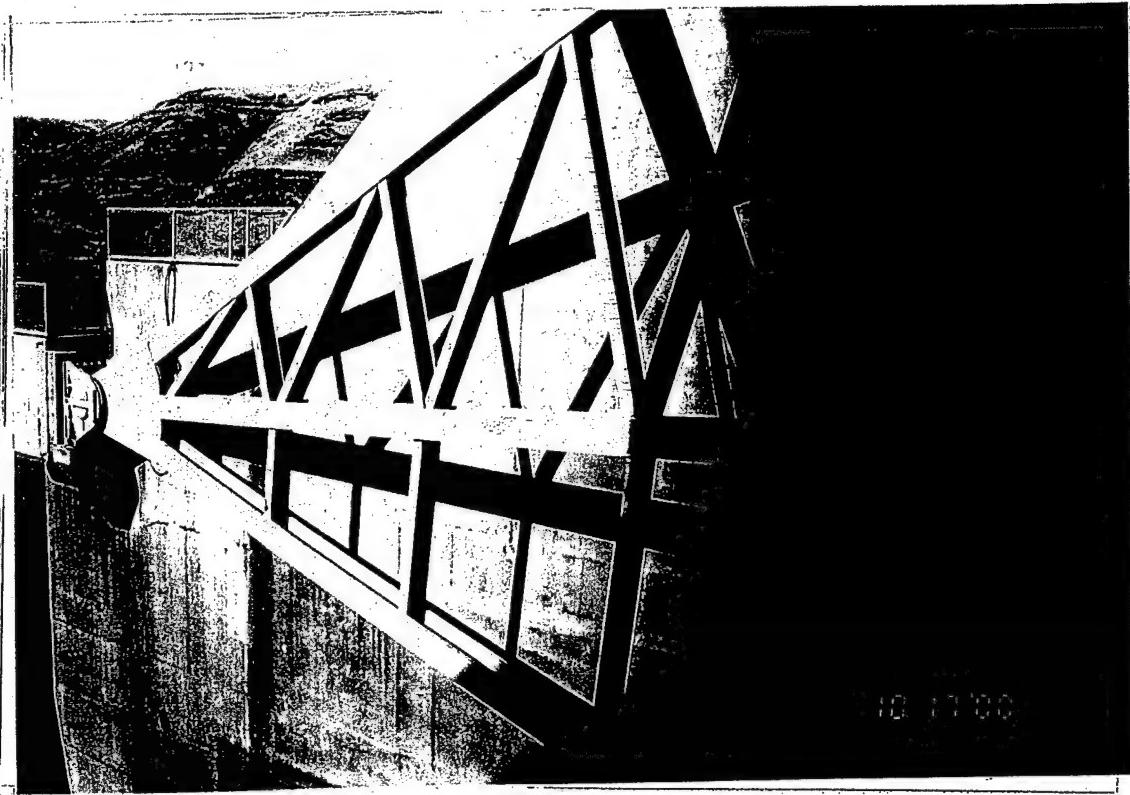


Little
Goose
Dam

10/17/00

Gate 2
Side seal leak, right end of bottom
horizontal girder.

2-6



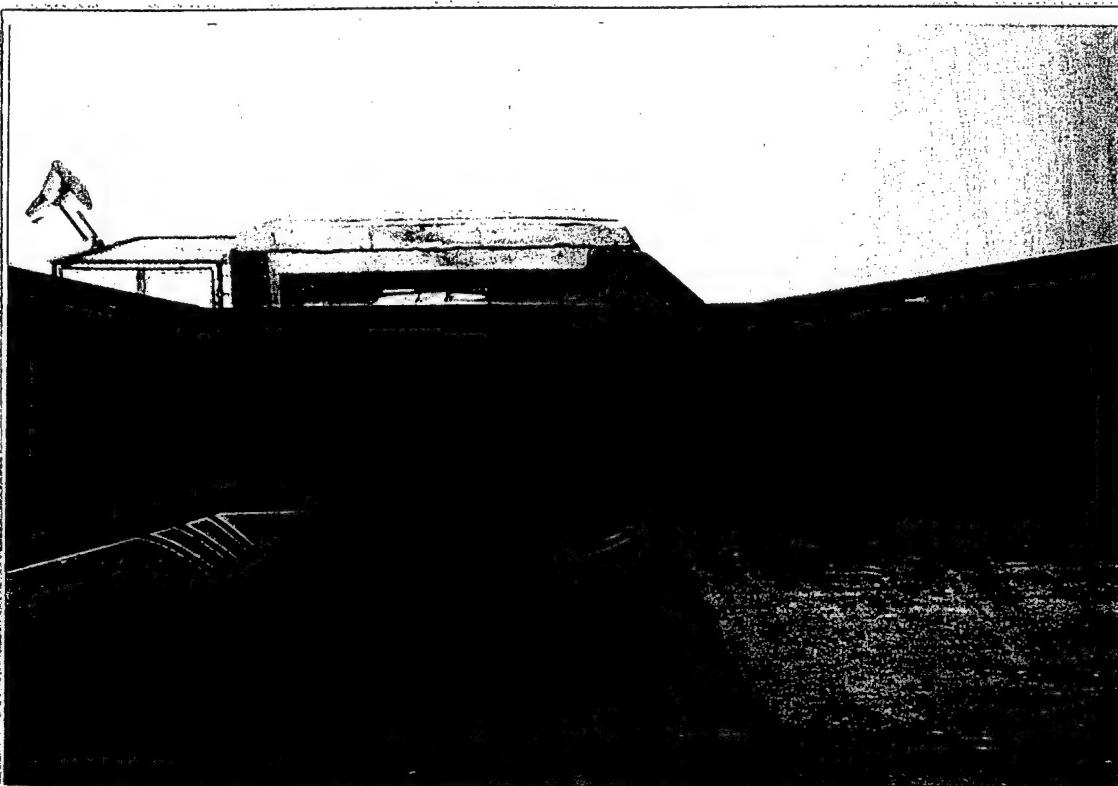
Little
Goose
Dam

10/17/00

2-7

Gate 2
Right frame, typical.

10/17/00

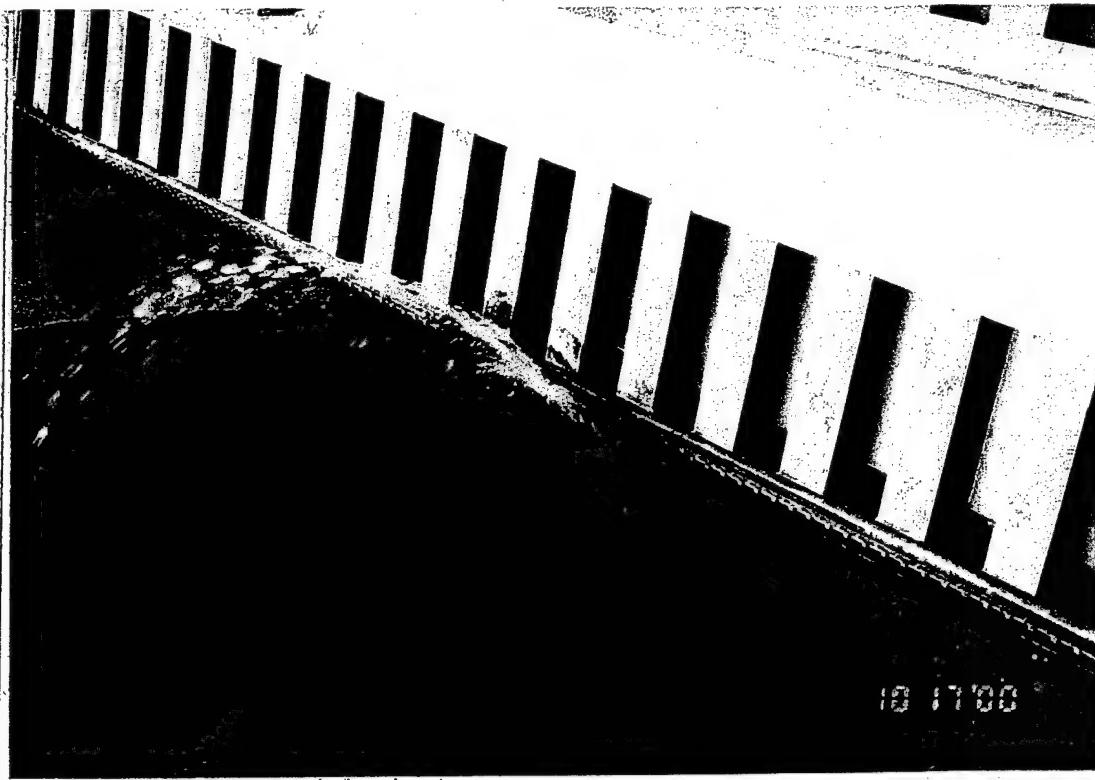


Little
Goose
Dam

10/17/00

2-8

Gate 2
Brace H, left frame. Light corrosion
on web.



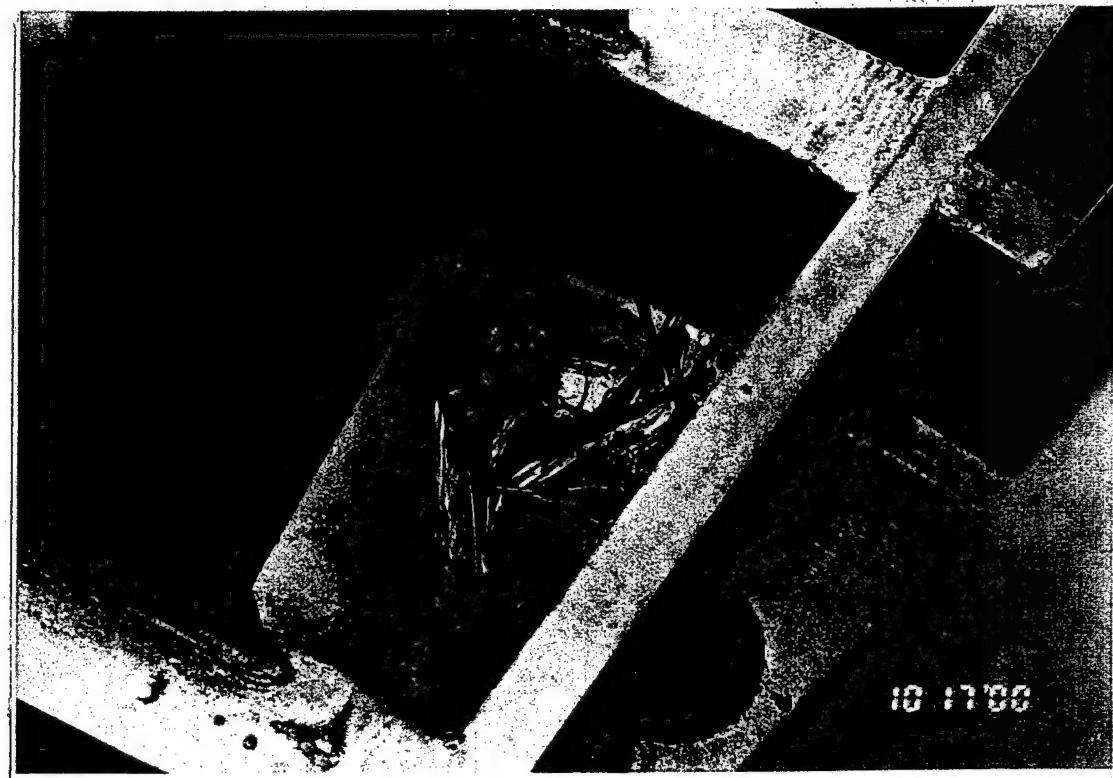
Little
Goose
Dam

10/17/00

2-9

Gate 2
Leak at center construction joint in
spillway monolith.

10 17'00



Little
Goose
Dam

10/17/00

2-10

Gate 2
Left frame between brace J and K.
Debris at upstream end of bottom
radial strut.

10 17'00



Little
Goose
Dam
10/17/00

2-11

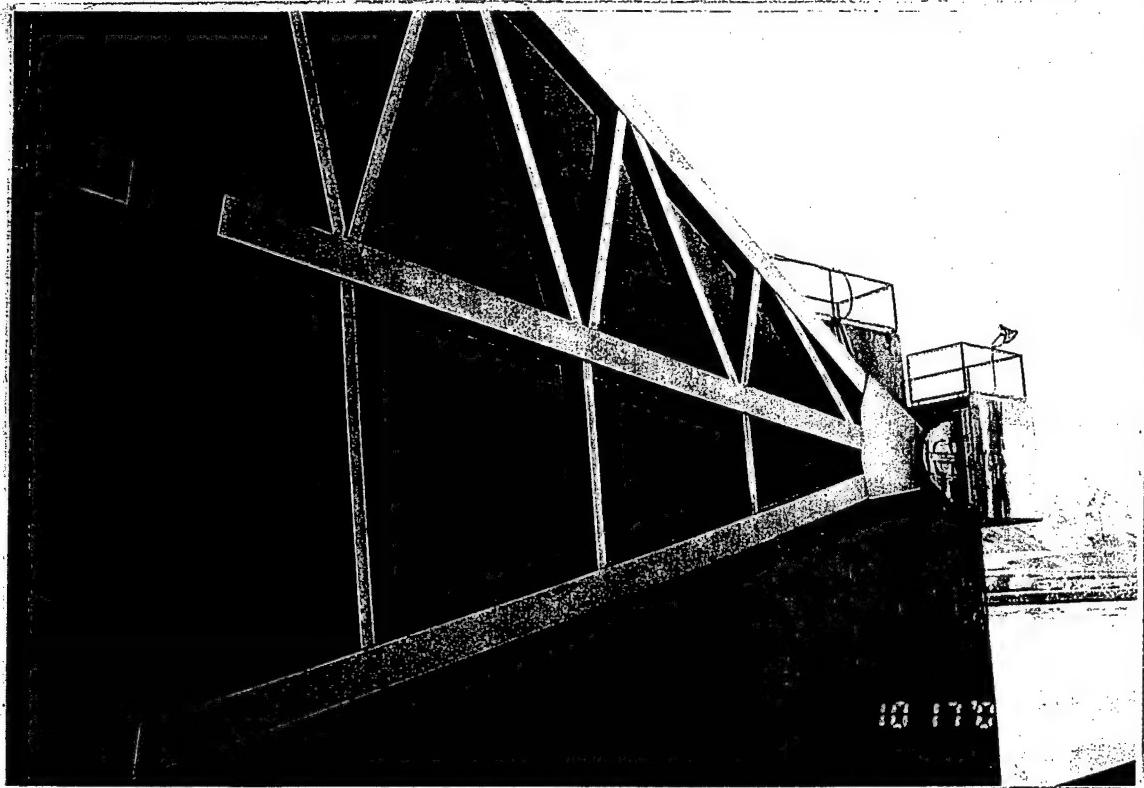
Gate 2
Bottom horizontal girder, left end.
Standing water, no drainage between
multiple stiffeners, typical.



Little
Goose
Dam
10/17/00

2-12

Gate 2
Bottom horizontal girder, Right end.
Standing water, no drainage between
multiple stiffeners, typical.



Little
Goose
Dam

10/17/00

2-13

Gate 2
Left frame, typical.



Little
Goose
Dam
10/17/00

Gate 2
Leak, bottom left corner of gate.
Bottom seal closure plate. Standing
water between closure plate, purlin
webs and skinplate. Typical.

2-14

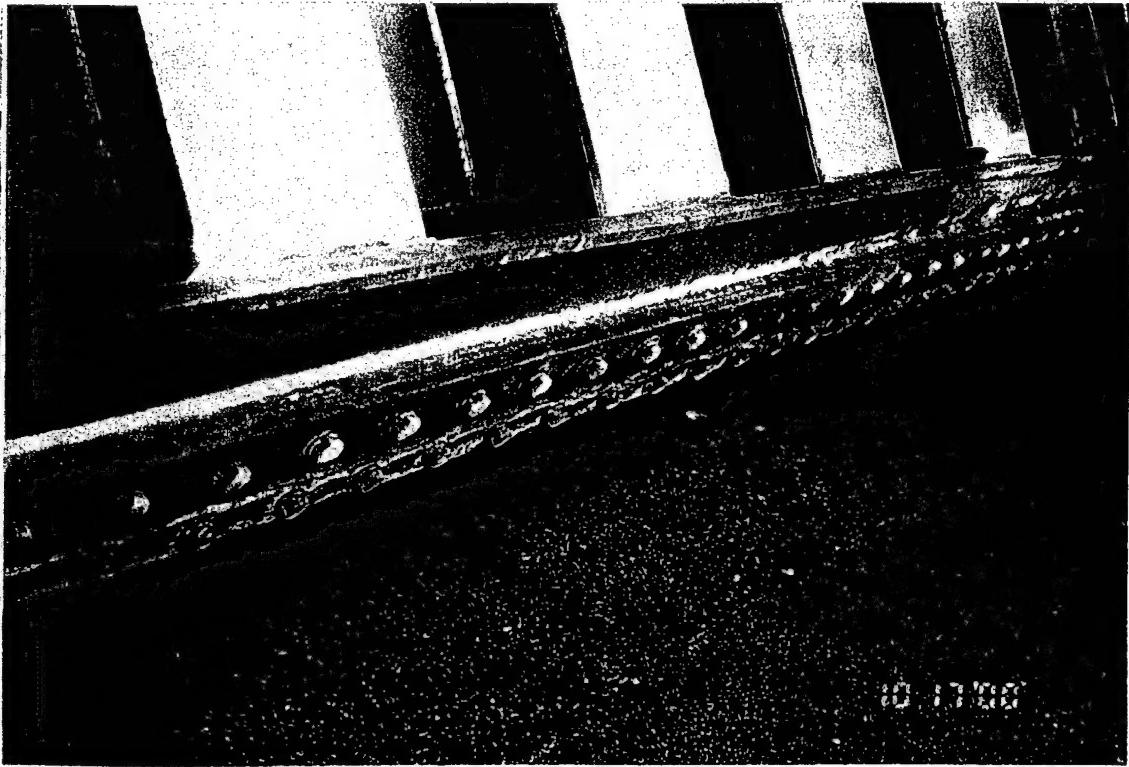


Little
Goose
Dam

10/17/00

2-15

Gate 2
Leak at center construction joint in
spillway monolith.

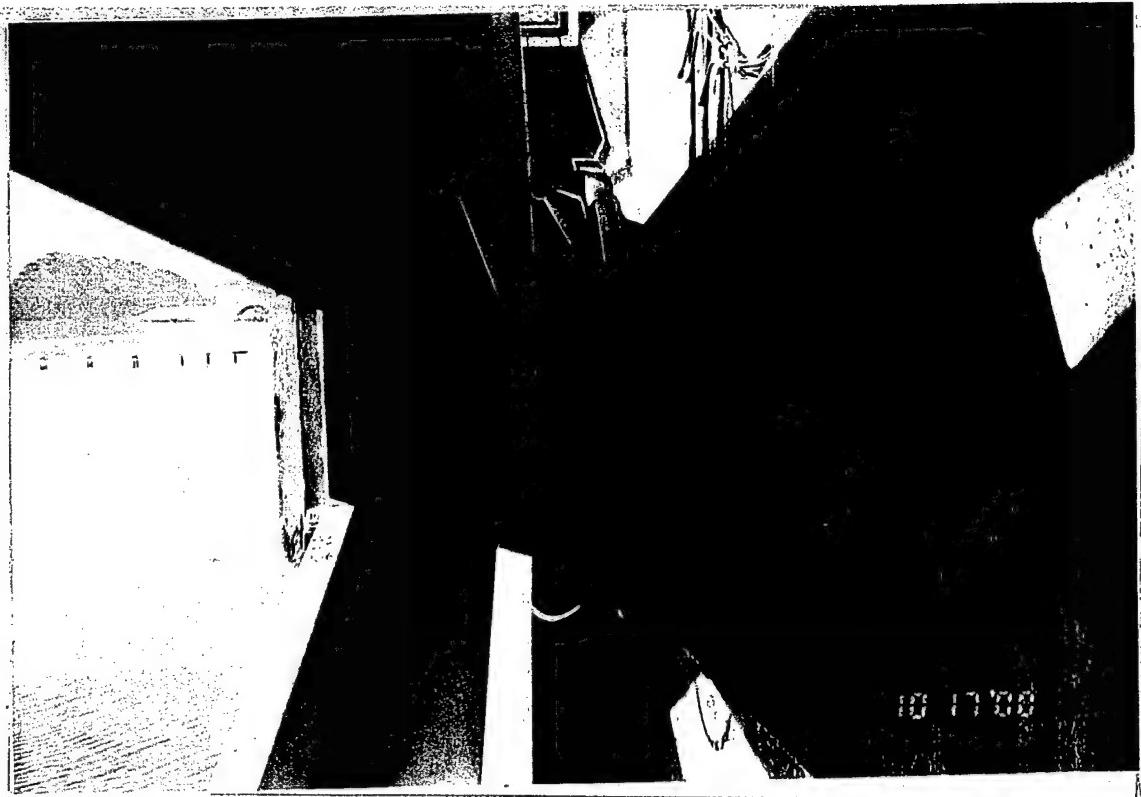


Little
Goose
Dam

10/17/00

2-16

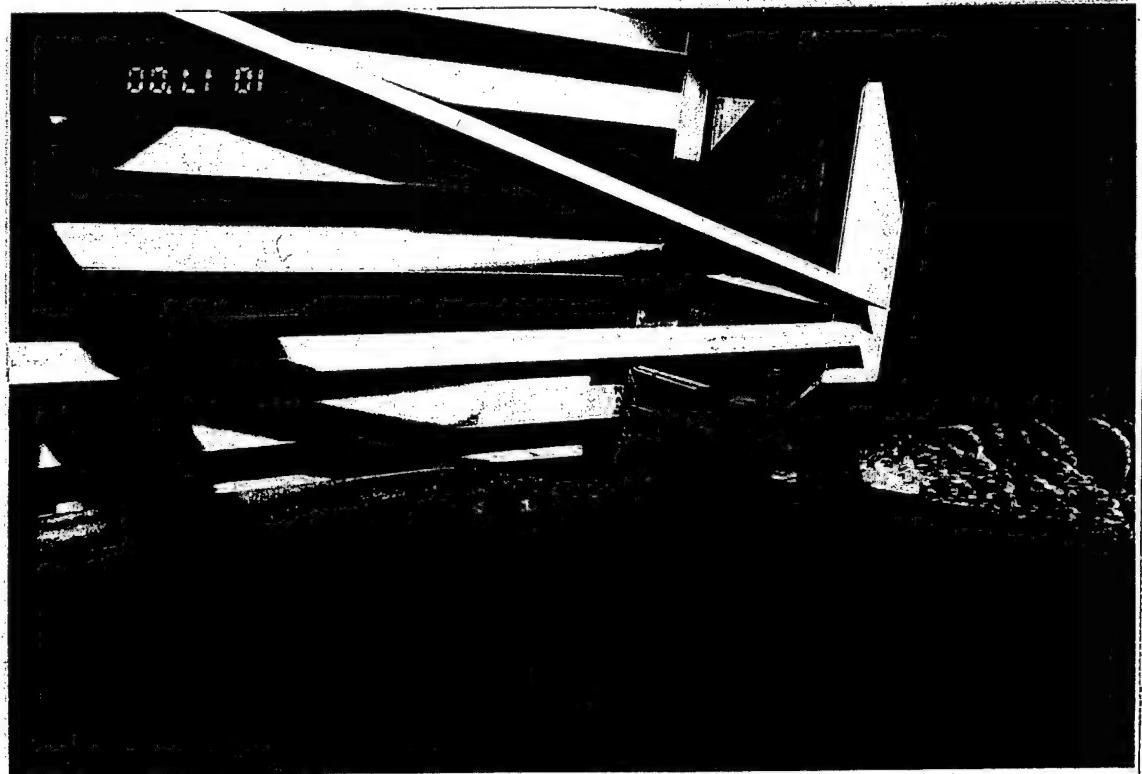
Gate 2
Bottom seal keeper plate, light
corrosion. Embedded bottom seal
plate, typical.



*Little
Goose
Dam
10/17/00

2-17

Gate 2
Inside closure plate at right trunnion.
Light corrosion and staining from
drain hole above.



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Little
Goose
Dam
10/17/00

2-18

Gate 2
Side seal leak, right side of gate.

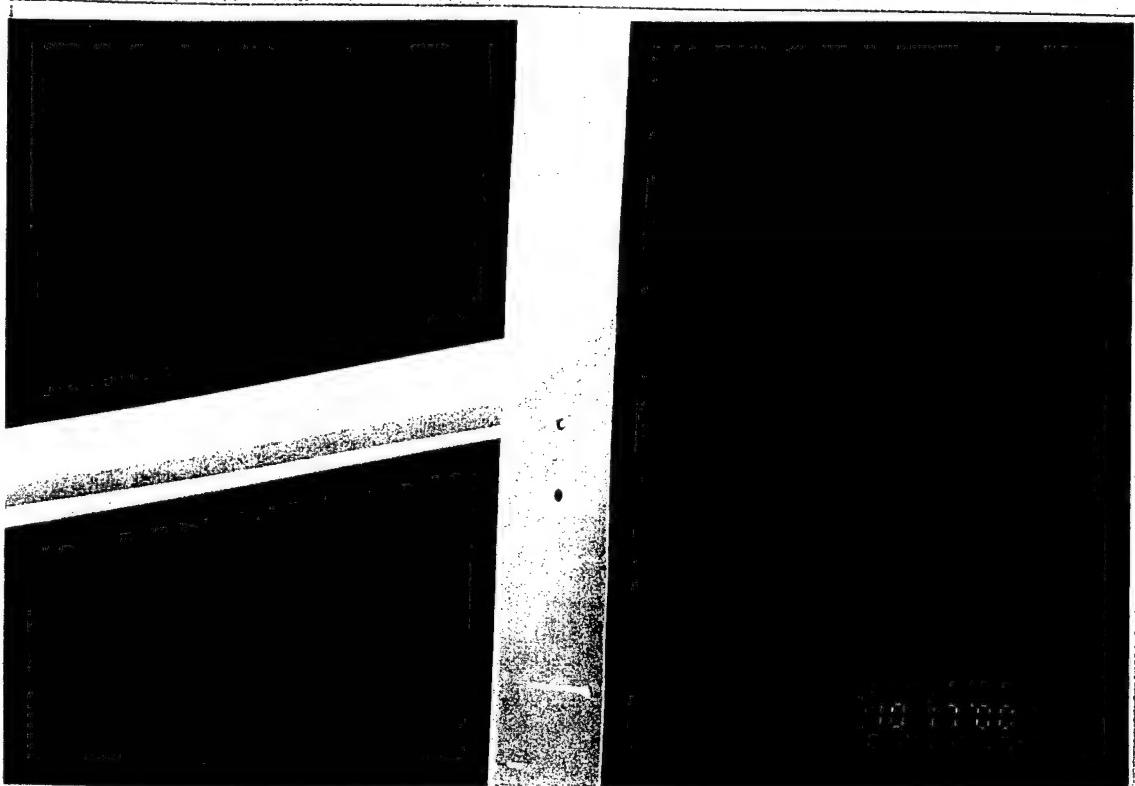


Little
Goose
Dam

10/17/00

2-19

Gate 2
Right trunnion block, typical.



Little
Goose
Dam

10/17/00

2-20

Gate 2
Extraneous holes, top plate at
purlins.



10/20/00

Little
Goose
Dam

Gate 2
Bottom seal keeper plate, typical.

10/20/00

2-21



Little
Goose
Dam

Gate 2
Bottom seal, typical.

10/20/00

2-22

00.02.01

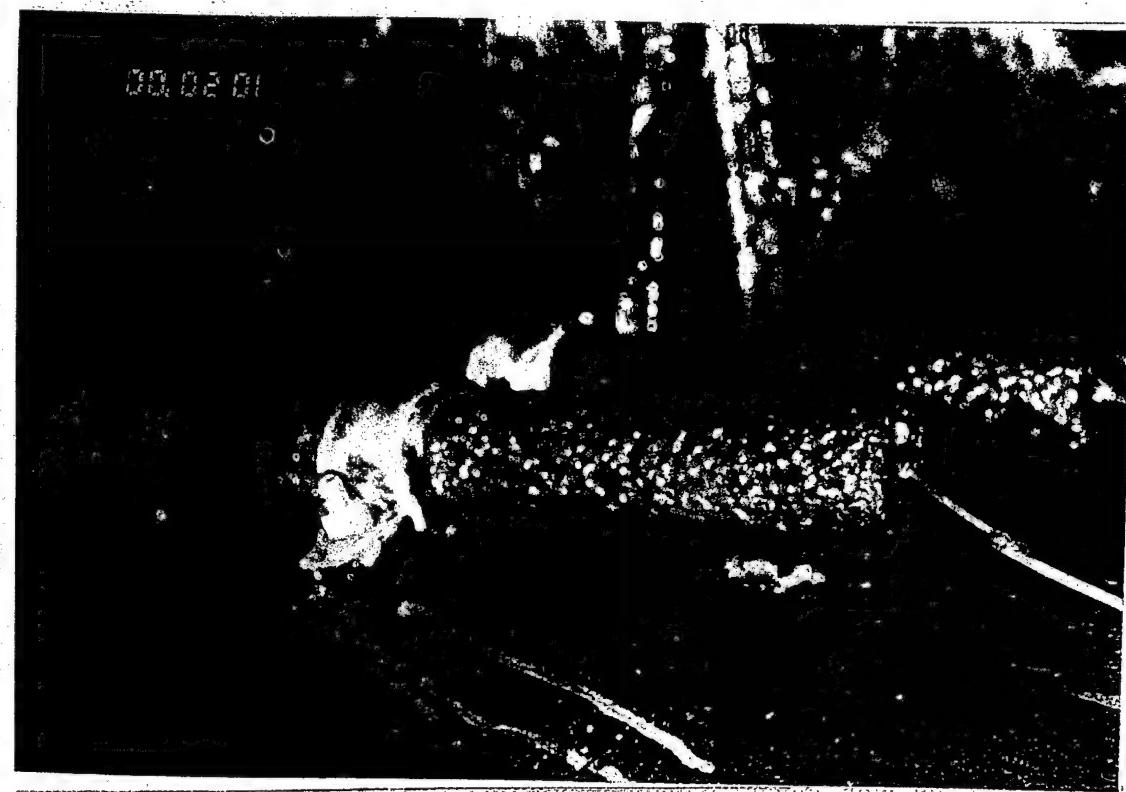


Little
Goose
Dam

10/20/00

2-23

Gate 2
Right hoist connection and zinc
anodes. Light corrosion on lifting
lugs.

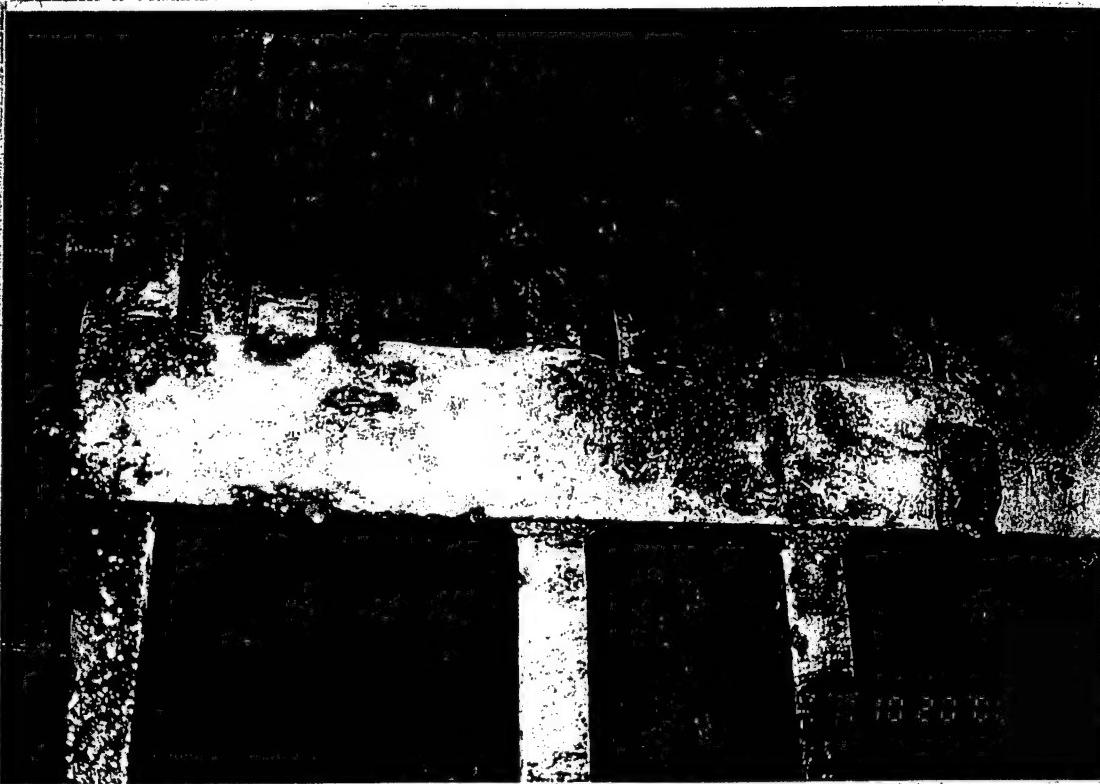


Little
Goose
Dam

10/20/00

2-24

Gate 2
Zinc anodes, good condition.



Little
Goose
Dam

Gate 2
Bottom of hoist connection. Light
corrosion on plates.

10/20/00

2-25



Little
Goose
Dam

Gate 2
Unidentified metal clamp near hoist
connection.

10/20/00

2-26



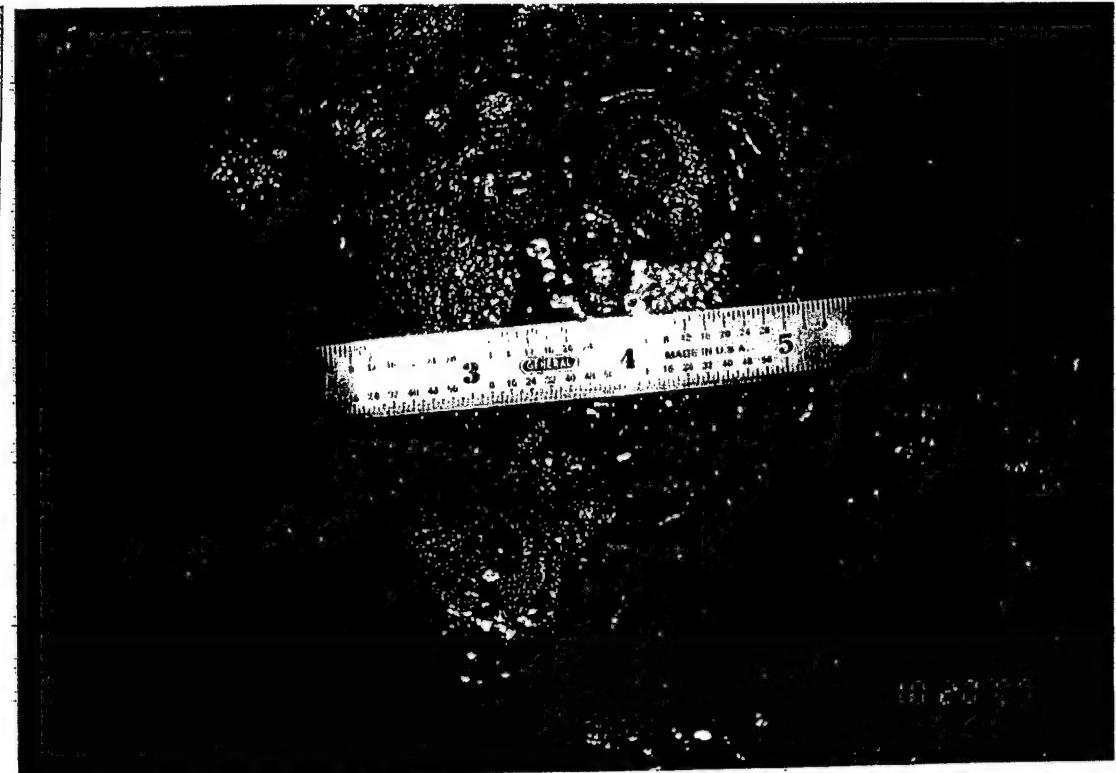
Little
Goose
Dam
10/20/00
2-27

Gate 2
Bottom seal closure plate looking upstream. Standing water between closure plate, purlin webs and skinplate. Typical.



Little
Goose
Dam
10/20/00
2-28

Gate 2
Skin plate pitting, typical.

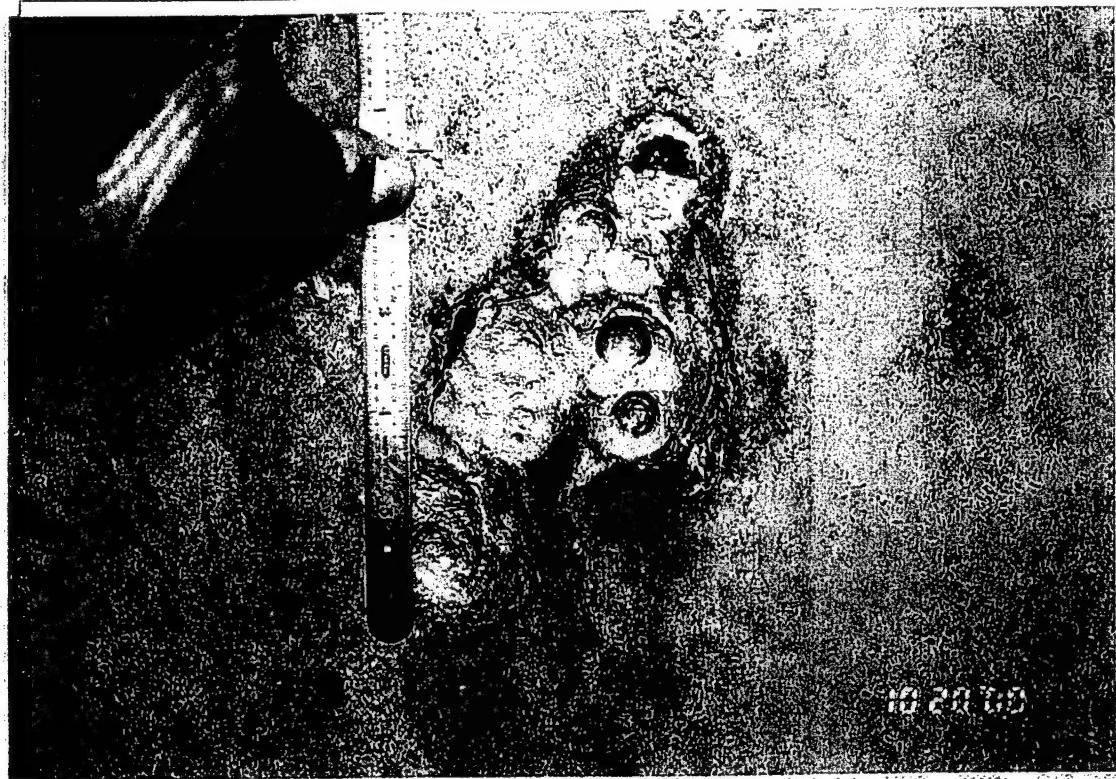


Little
Goose
Dam

10/20/00

2-29

Gate 2
Skin plate pitting, typical.



Little
Goose
Dam

10/20/00

2-30

Gate 2
Skin plate pitting, typical.



10 20' 00

Little
Goose
Dam

Gate 2
Skin plate condition, typical.

10/20/00

2-31



13 23' 00

Little
Goose
Dam

Gate 2
Top of hoist connection.

10/20/00

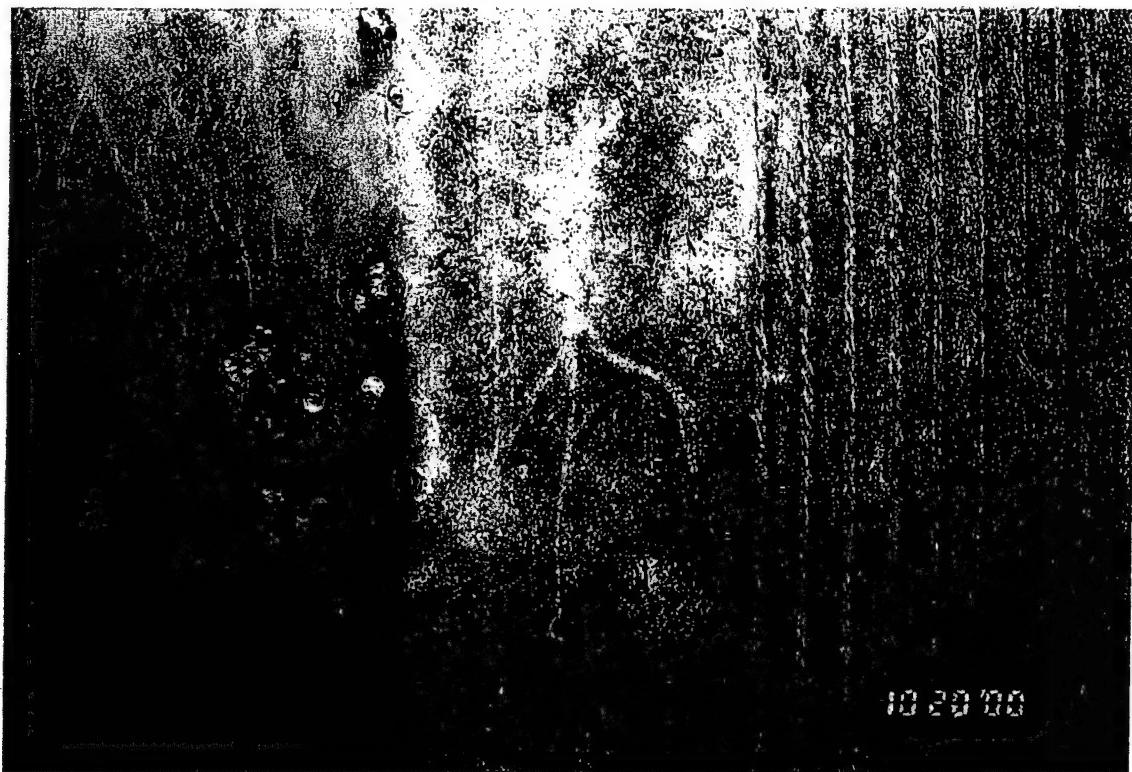
2-32



Little
Goose
Dam
10/20/00

Gate 2
Delaminates vinyl, right side of wear
plate, just below skin plate transition
from 3/8" to 1/2".

2-33



Little
Goose
Dam
10/20/00

Gate 2
Skin plate pitting adjacent to wear
plate, typical.

2-34

Little
Goose
Dam

10/12/00

3-1



Gate 3

Left side of gate. Light corrosion on
members.



10 12 '00

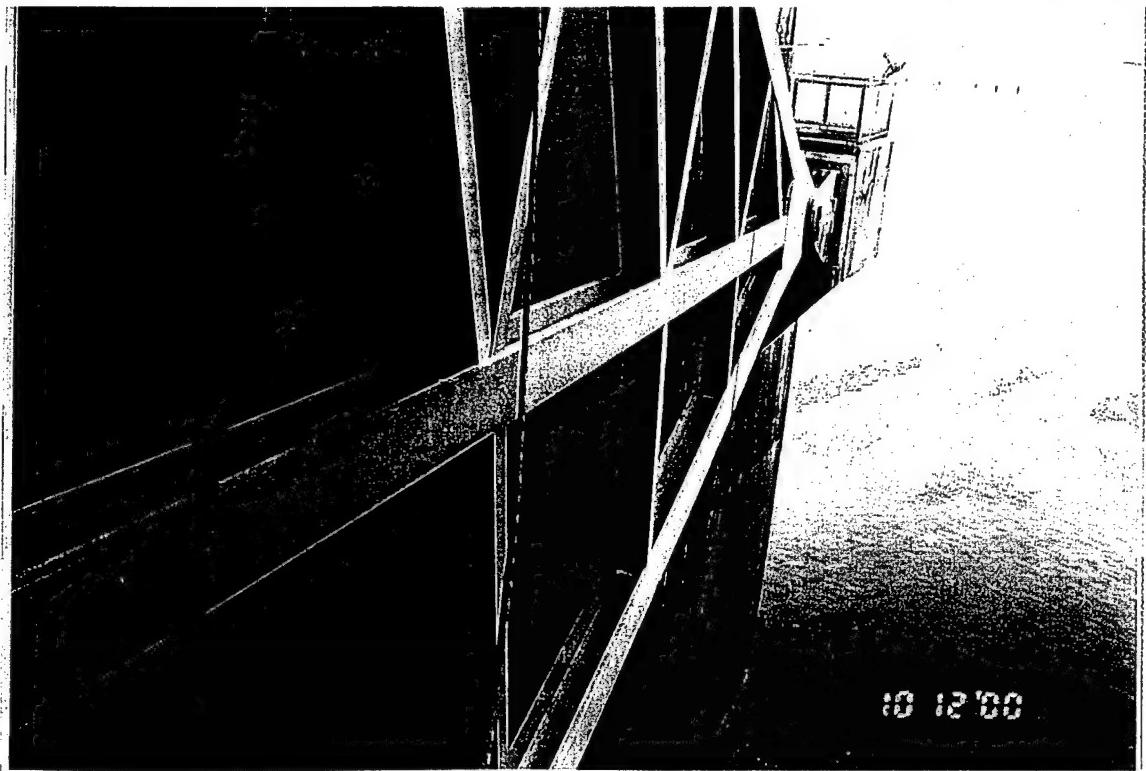
Little
Goose
Dam

10/12/00

3-2

Gate 3

Left frame, middle radial strut,
typical.



Little
Goose
Dam

10/12/00

3-3

Gate 3
Left frame, typical.

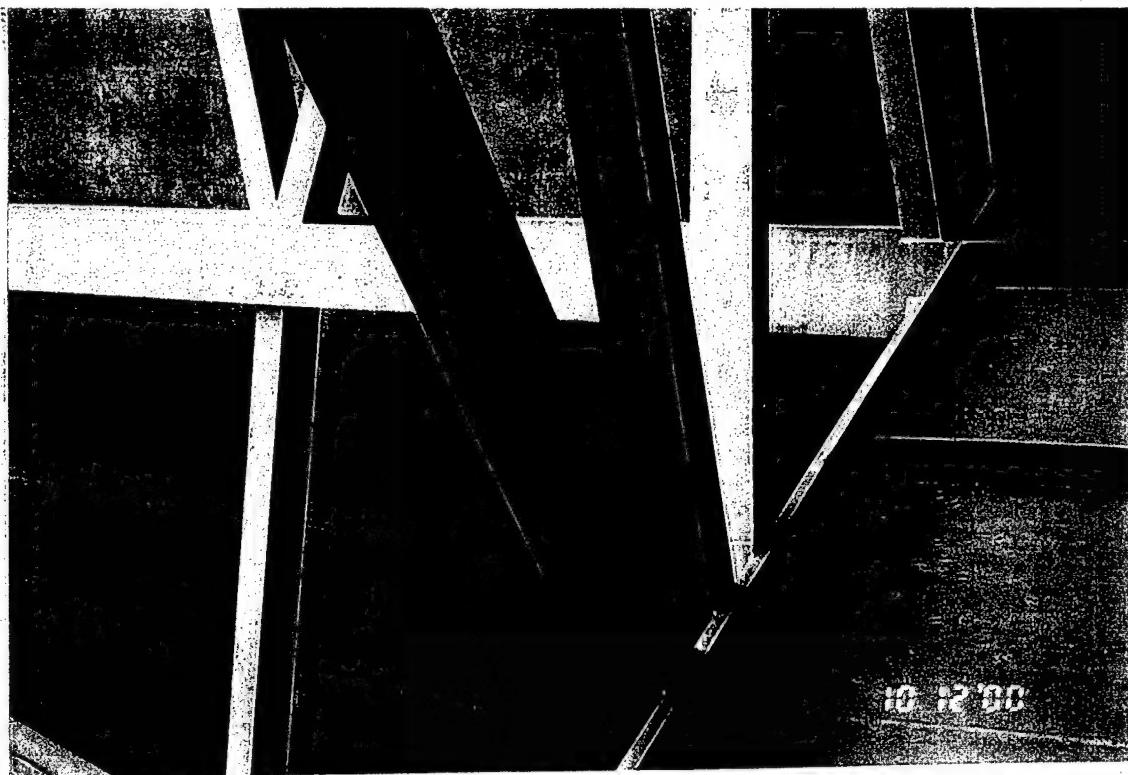


Little
Goose
Dam

10/12/00

3-4

Gate 3
Left frame, Brace A. Light corrosion
on upstream side.

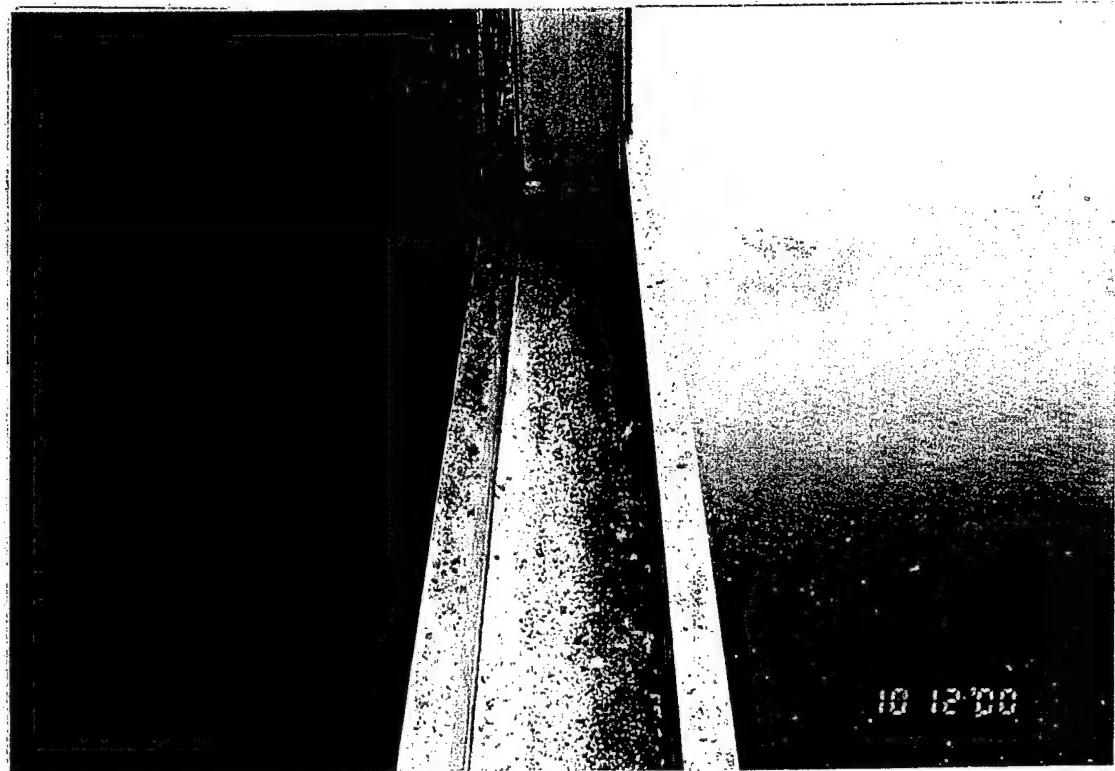


Little
Goose
Dam

Gate 3
Middle horizontal girder bracing.
Light corrosion on braces.

10/12/00

3-5



Little
Goose
Dam

Gate 3
Middle radial strut, left frame. Light
corrosion on strut.

10/12/00

3-6



Little
Goose
Dam
10/12/00

Gate 3
Bottom horiz. girder, left end.
Standing water, no drainage between
multiple stiffeners, typical.

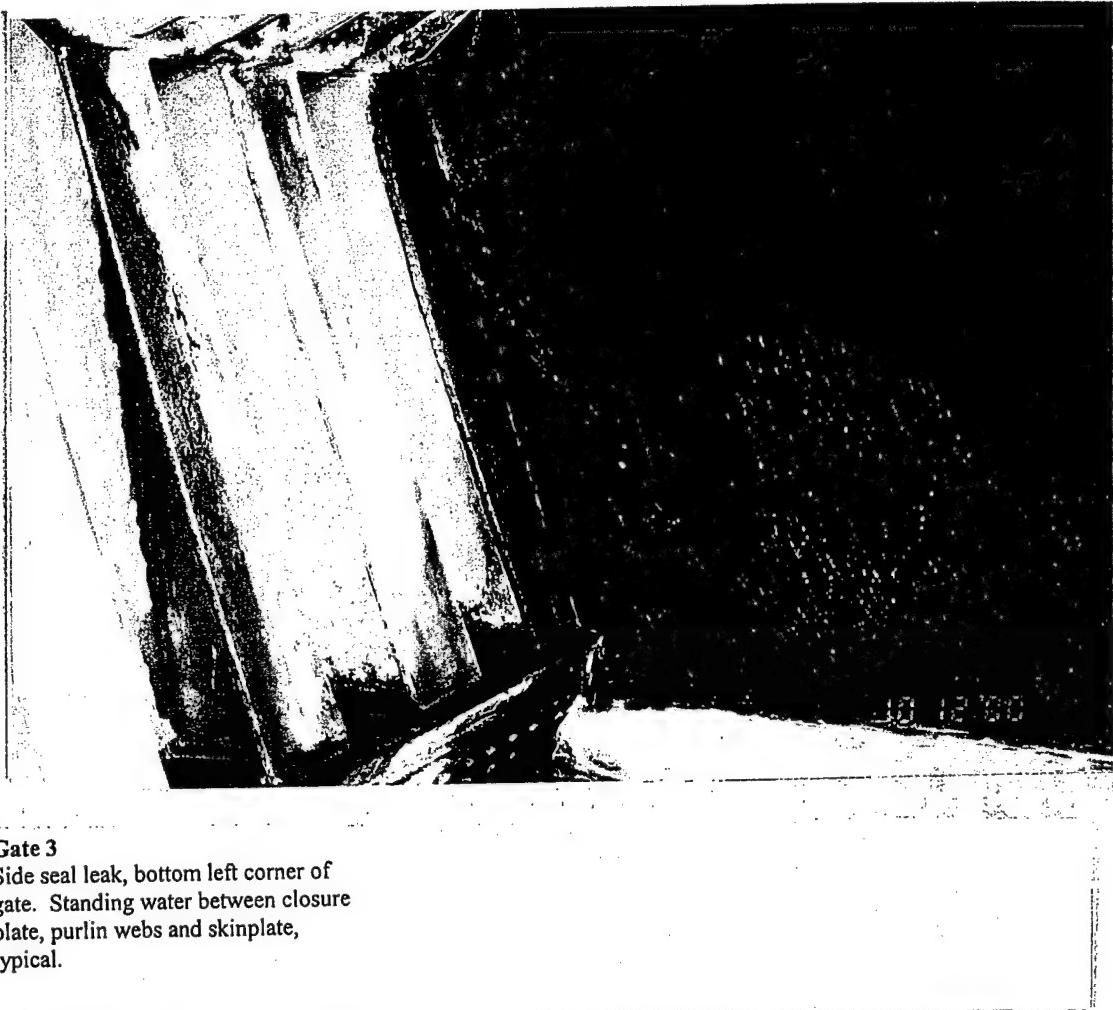
3-7



Little
Goose
Dam
10/12/00

Gate 3
Standing water between closure plate,
purlin webs and skinplate, typical.
Light corrosion around drain hole at
upstream side of bottom radial strut.

3-8



Little
Goose
Dam

10/12/00

3-9

Gate 3
Side seal leak, bottom left corner of
gate. Standing water between closure
plate, purlin webs and skinplate,
typical.



Little
Goose
Dam

10/12/00

3-10

Gate 3
Standing water between closure plate,
purlin webs and skinplate, typical.



Little
Goose
Dam

10/12/00

3-11

Gate 3
Leak at center construction joint in
spillway monolith.



Little
Goose
Dam
10/12/00

3-12

Gate 3
Bottom horizontal girder, right end.
Standing water, no drainage between
multiple stiffeners, typical.



Little
Goose
Dam
10/12/00

Gate 3
Close-up, bottom horizontal girder.
Standing water, no drainage between
multiple stiffeners, typical.

3-13



Little
Goose
Dam

10/12/00

Gate 3
Bottom side of right frame, typical.

3-14

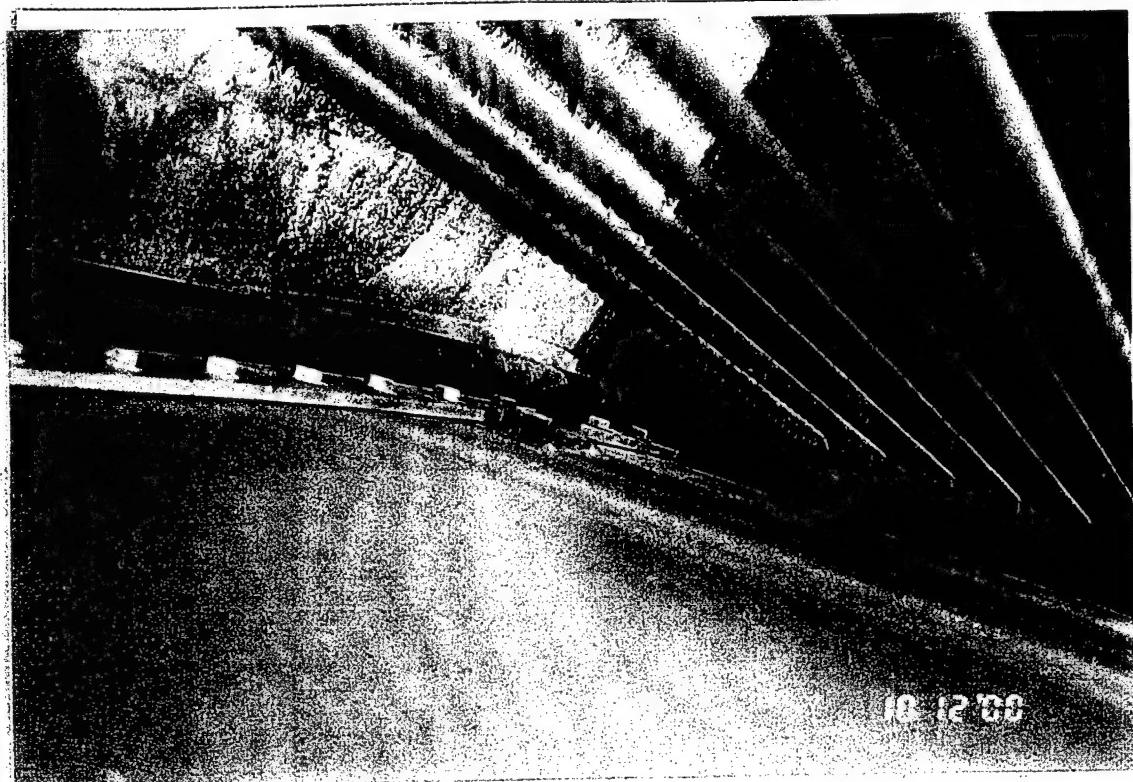


Little
Goose
Dam

10/12/00

3-15

Gate 3
Top of side seal, typical.



Little
Goose
Dam

10/12/00

Gate 3
Top upstream skinplate at hoist
cables. Moderate corrosion on
unidentified metal.

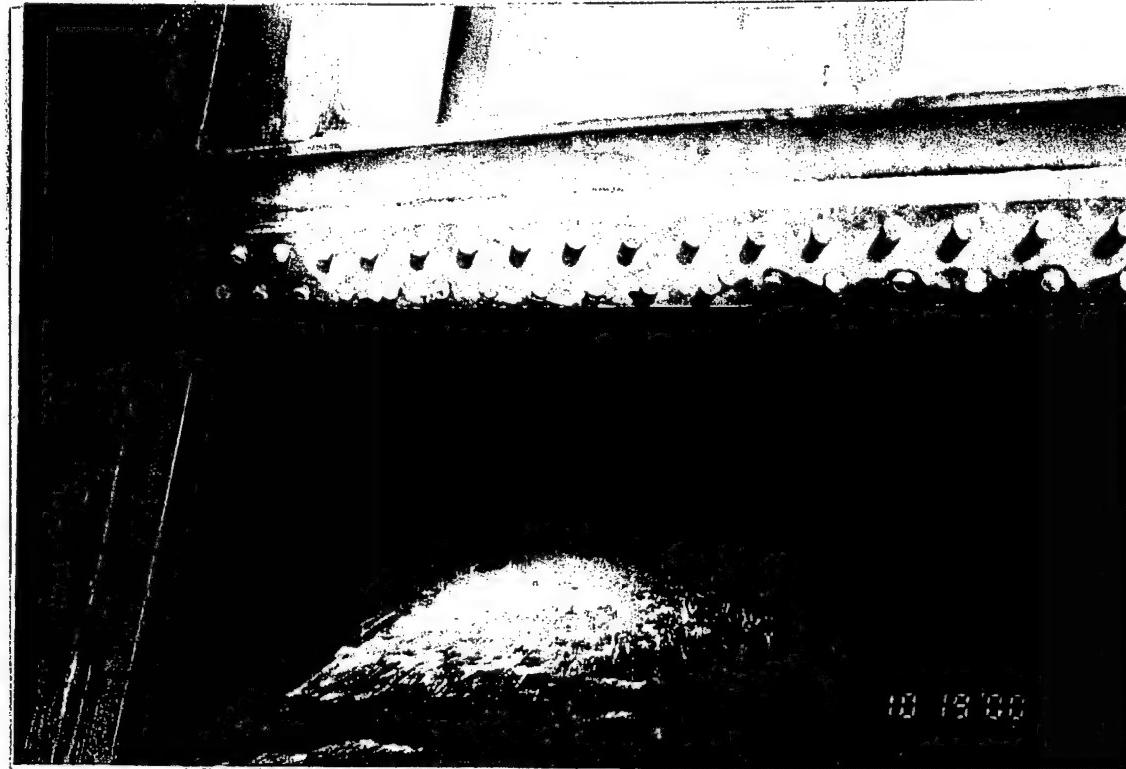
3-16



Little
Goose
Dam
10/19/00

Gate 3
Bottom of left side of gate at 3' open.
Note: Heavy falling water due to
stop log leakage precludes inspection
of hoist connections.

3-17



Little
Goose
Dam
10/19/00

Gate 3
Bottom of right side of gate at 3'
open. Note: Heavy falling water due
to stop log leakage precludes
inspection of hoist connections.

3-18



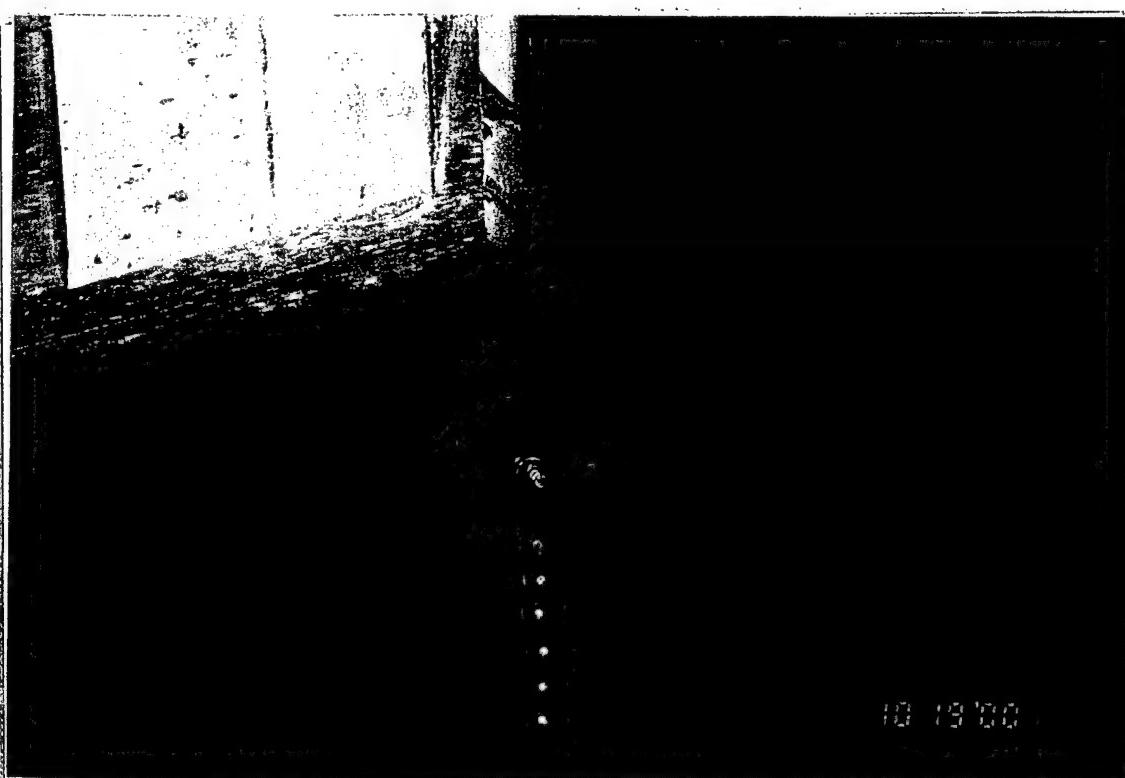
Little
Goose
Dam

10/19/00

3-19

Gate 3
Skin plate condition, typical.
Minimal pitting.

10/19/00



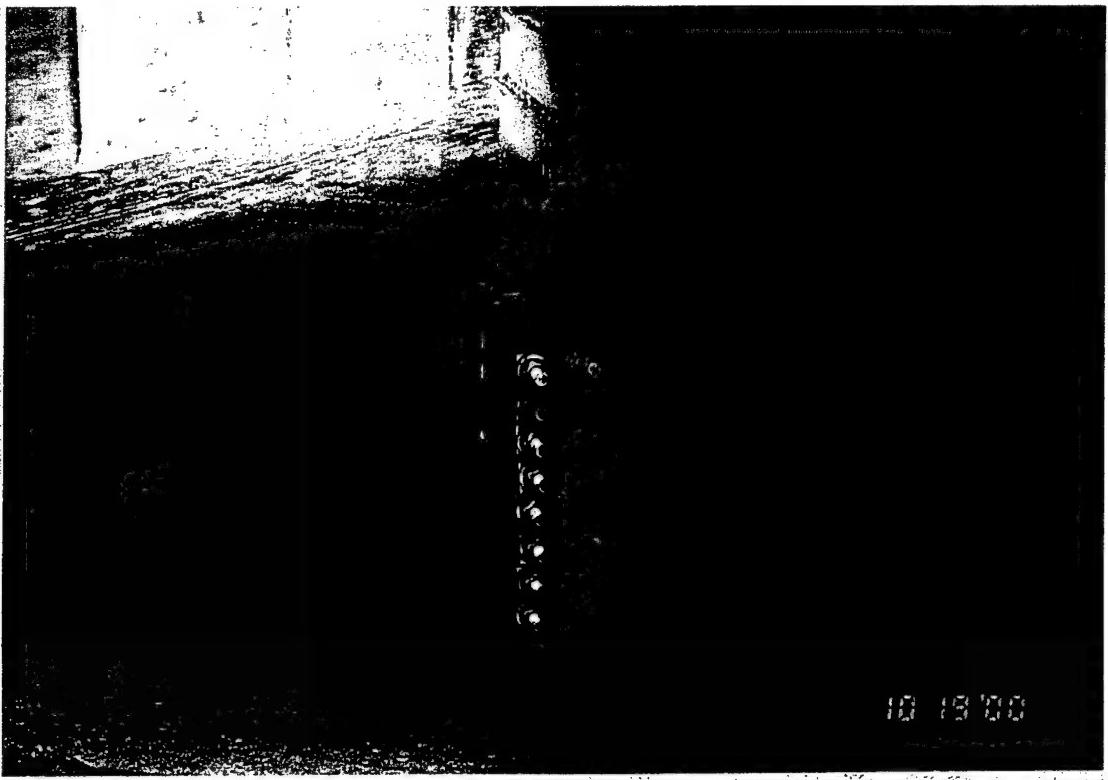
Little
Goose
Dam

10/19/00

3-20

Gate 3
Hoist connection, right side of gate.

10/19/00



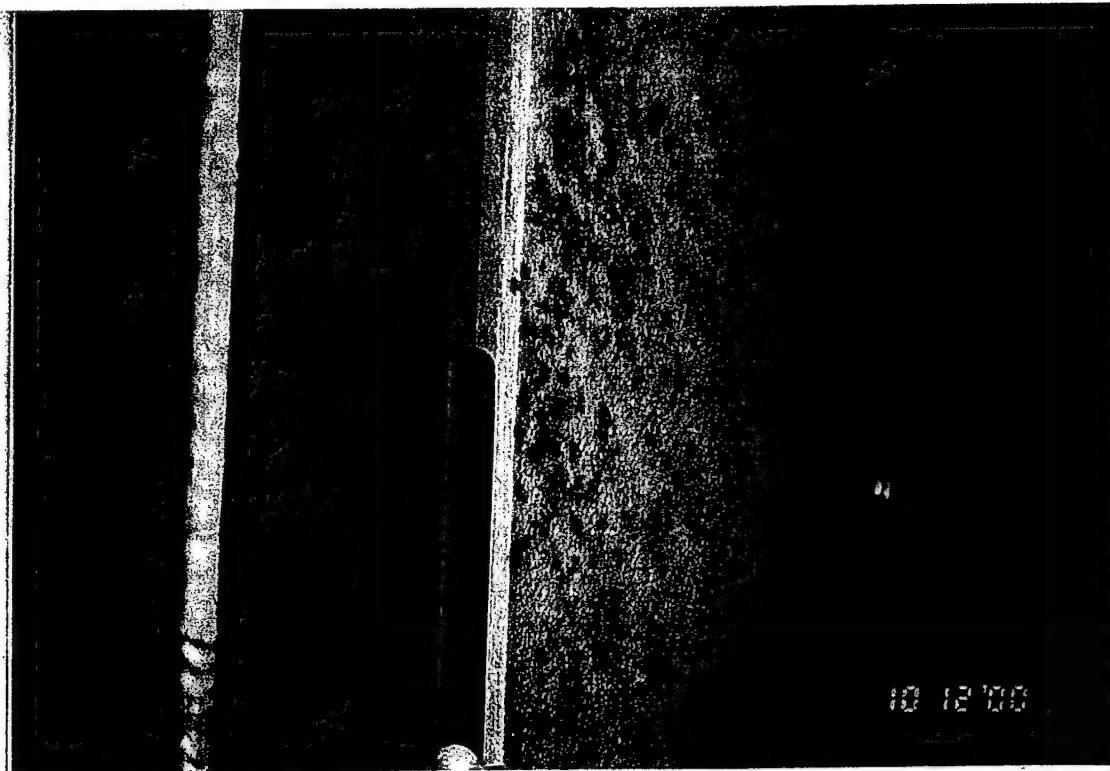
10-19-00

Little
Goose
Dam

10/19/00

3-21

Gate 3
Hoist connection, left side of gate.



Little
Goose
Dam

10/12/00

4-1



Little
Goose
Dam

10/12/00

4-2

Gate 4
Top horizontal girder. Light
corrosion, typical.

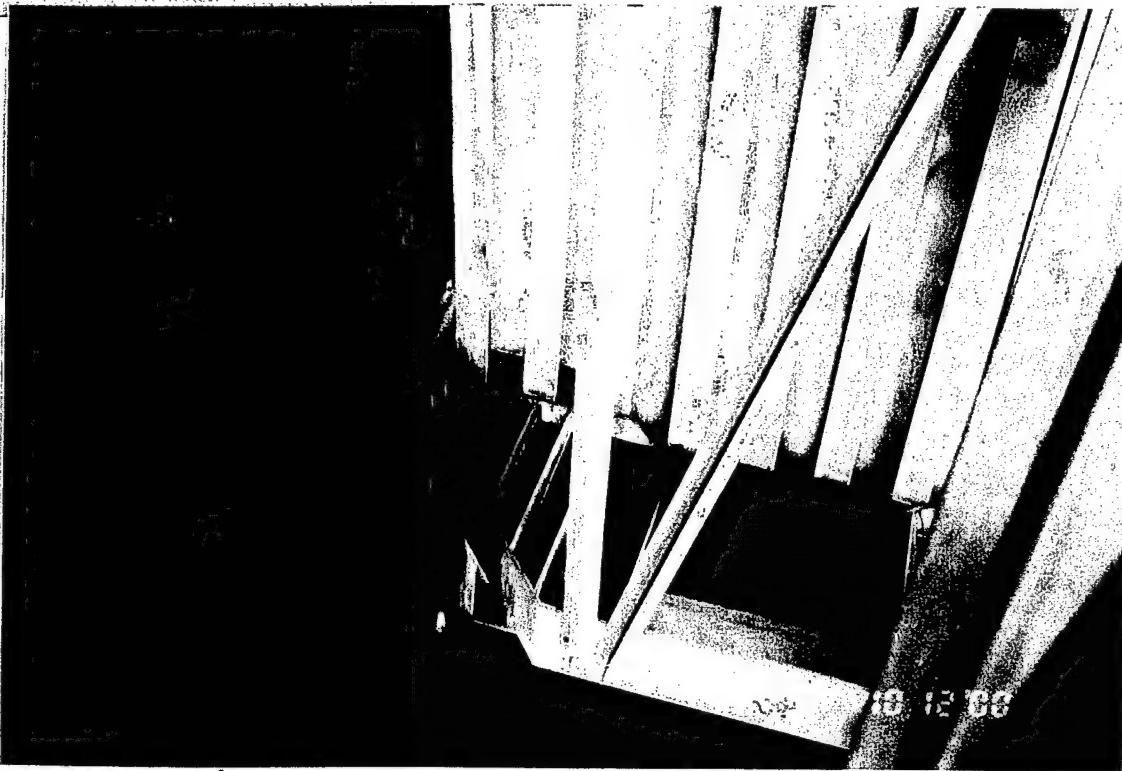


10-12'00

Little
Goose
Dam
10/12/00

4-3

Gate 4
Downstream side of skin plate, right
side of gate above top horizontal
girder. Possible previous skin plate
repair.

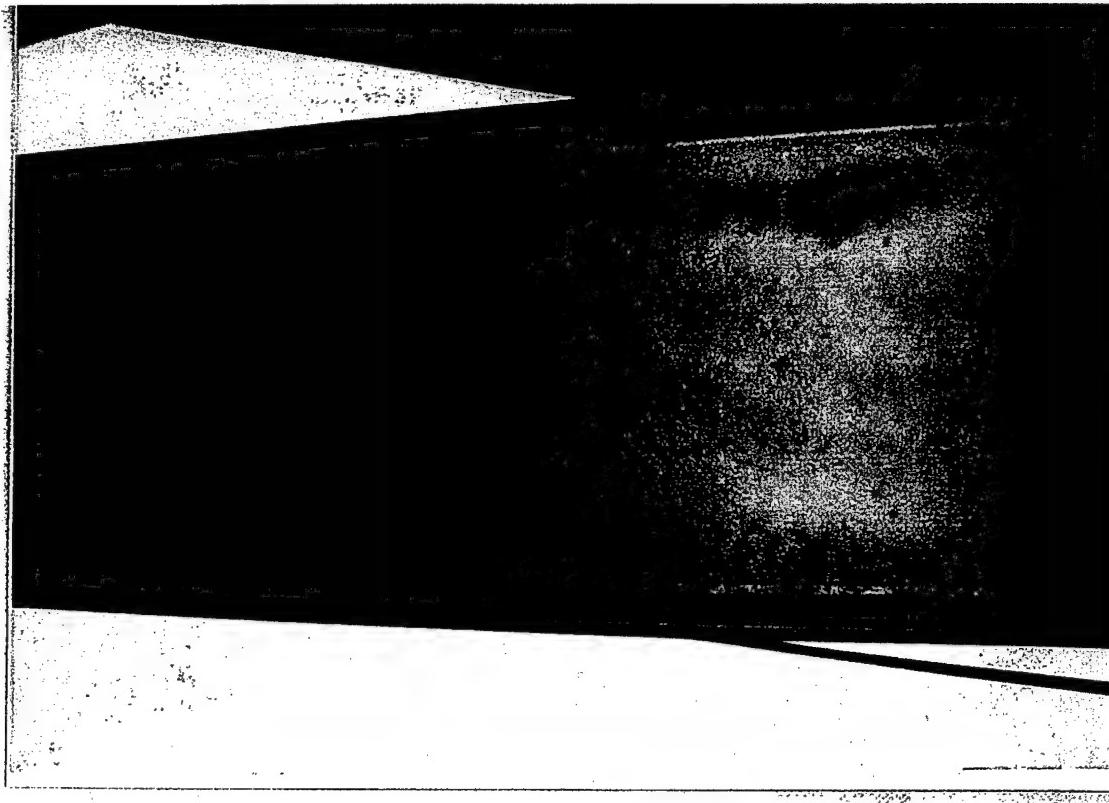


10-12'00

Little
Goose
Dam
10/12/00

4-4

Gate 4
Bottom horizontal girder, left side.
Standing water, no drainage between
multiple stiffeners, typical. Side seal
leak.



Little
Goose
Dam

10/12/00

4-5

Gate 4
Right frame, brace K. Light corrosion
on brace.



Little
Goose
Dam

10/12/00

4-6

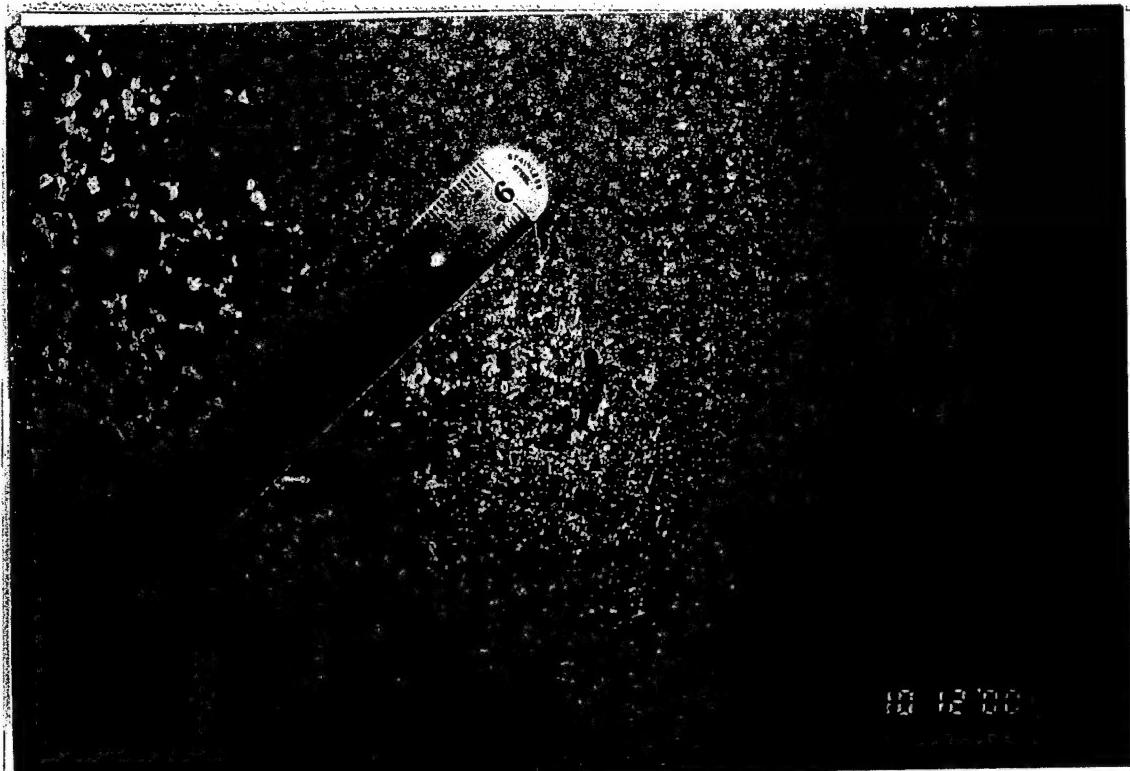
Gate 4
Downstream side of skin plate, above
middle horizontal girder, right side of
gate. Small circular protrusion in
vertical line on skin plate.



Little
Goose
Dam
10/12/00

4-7

Gate 4
Downstream side of skin plate, right
side of gate above bottom horizontal
girder. Possible previous skin plate
repair.



10/12/00

Little
Goose
Dam
10/12/00

4-8

Gate 4
Brace J, left frame. Small scratches
on web.

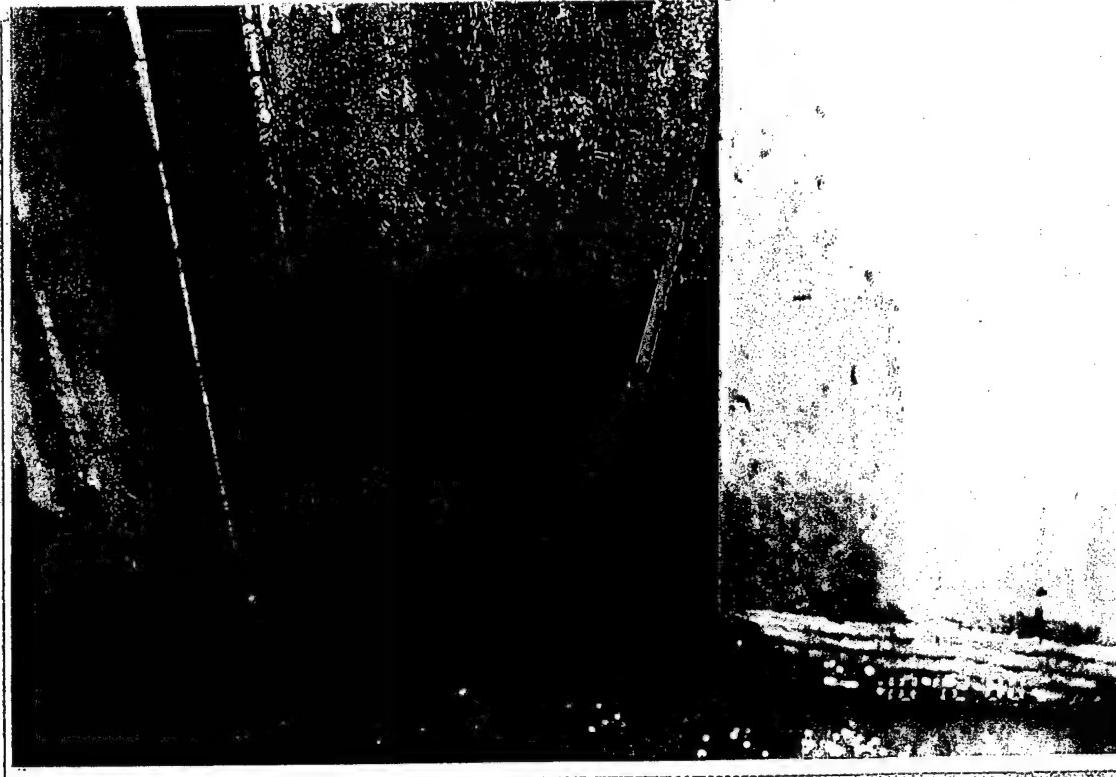


Little
Goose
Dam

10/12/00

4-9

Gate 4
Bottom horizontal girder, right side.
Standing water, no drainage between
multiple stiffeners, typical. Side seal
leak.



Little
Goose
Dam

10/12/00

4-10

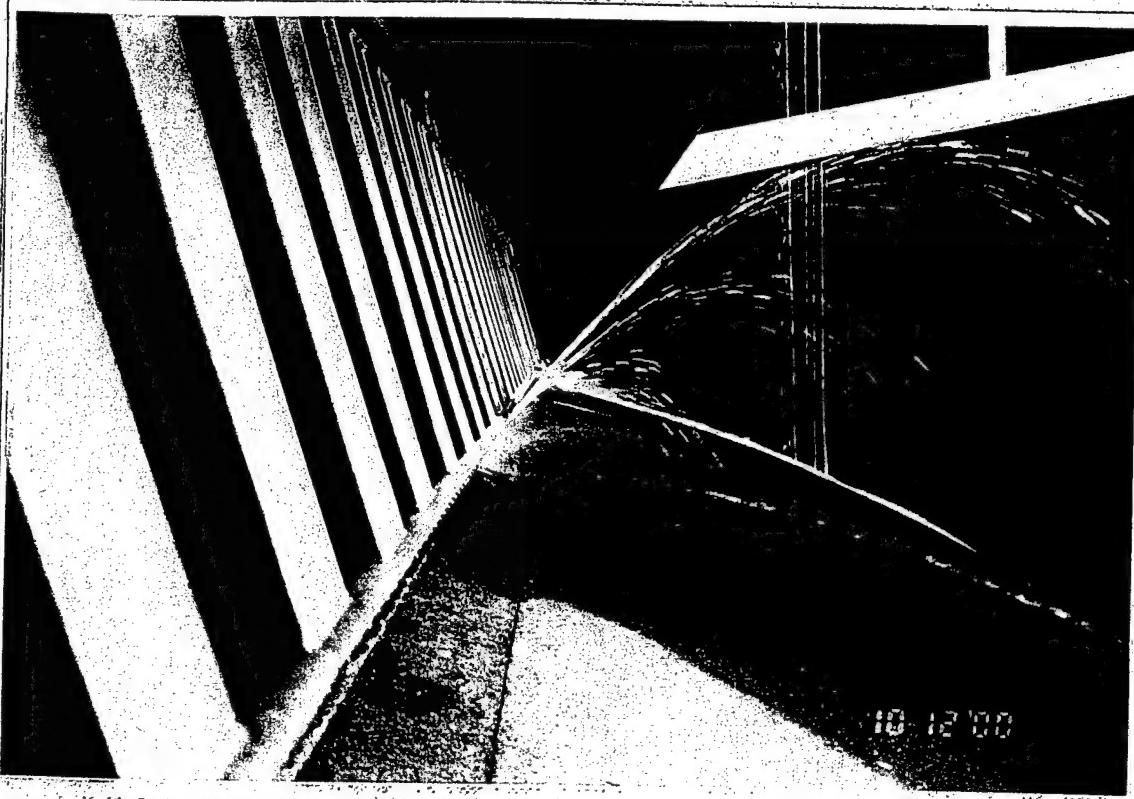
Gate 4
Bottom seal closure plate looking
upstream. Standing water between
closure plate, purlin webs and
skinplate. Typical.



Little
Goose
Dam
10/12/00

4-11

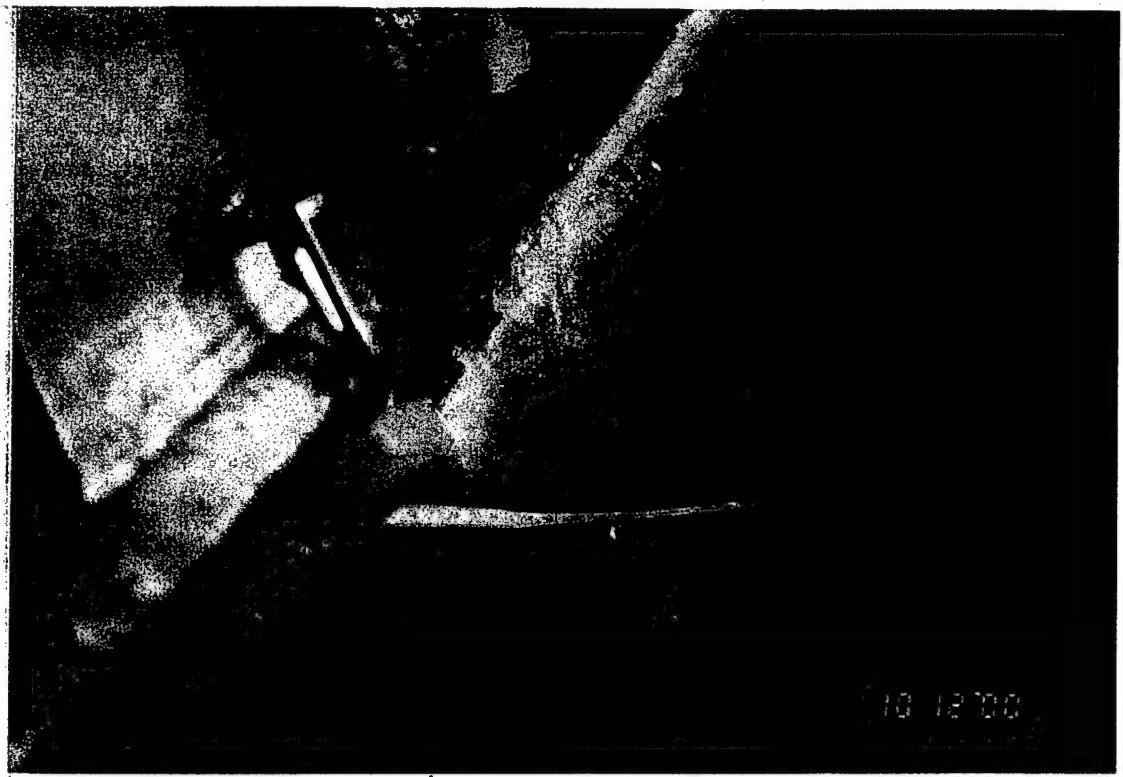
Gate 4
Standing water between closure plate,
purlin webs and skinplate, typical.
Bottom right corner seal leak.



Little
Goose
Dam
10/12/00

4-12

Gate 4
Leak at center construction joint in
spillway monolith.



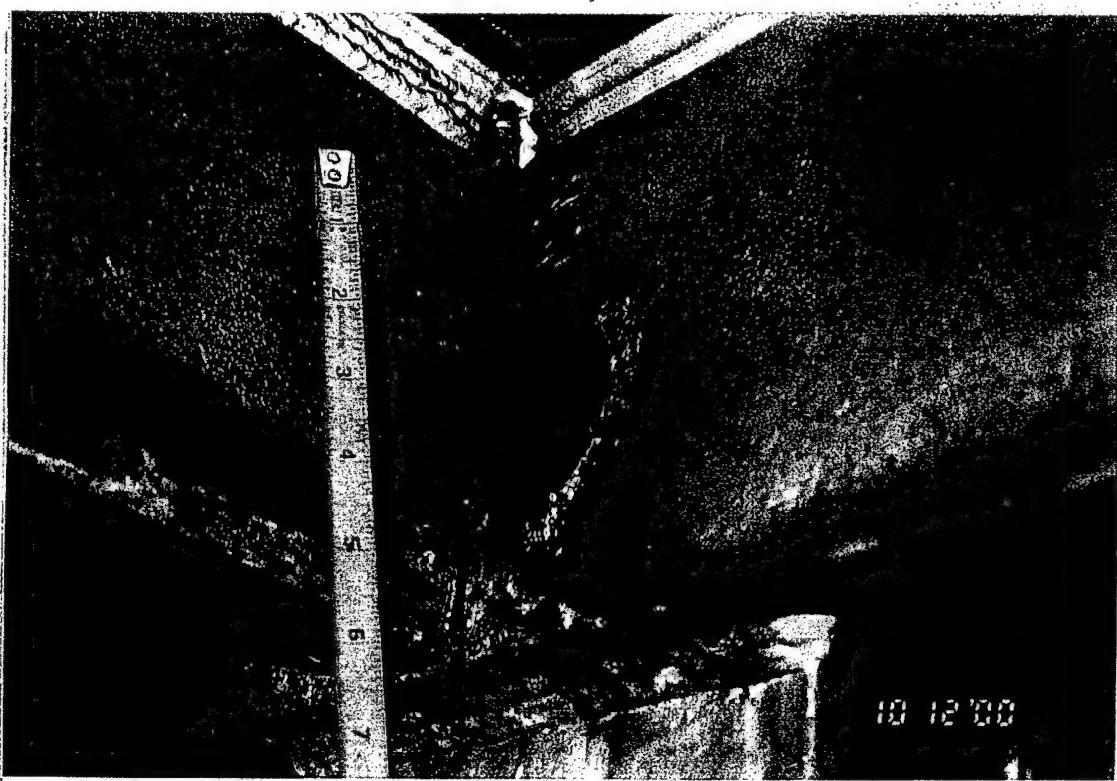
10/12/00

• Little
Goose
Dam

Gate 4
Leak at center construction joint in
spillway monolith.

10/12/00

4-13



10/12/00

Little
Goose
Dam

10/12/00

Gate 4
Bottom of bottom horizontal girder,
upstream flange and stiffener.
Moderate corrosion due to horizontal
girder drain hole above.

4-14



Little
Goose
Dam

10/12/00

4-15

Gate 4

Bottom of bottom horizontal girder.
Drain hole for upstream side of
bottom horizontal girder. Light to
moderate corrosion on surrounding
members.



Little
Goose
Dam

10/12/00

4-16

Gate 4

Bottom of bottom horizontal girder.
Drain hole for upstream side of
bottom horizontal girder. Light to
moderate corrosion on surrounding
members.

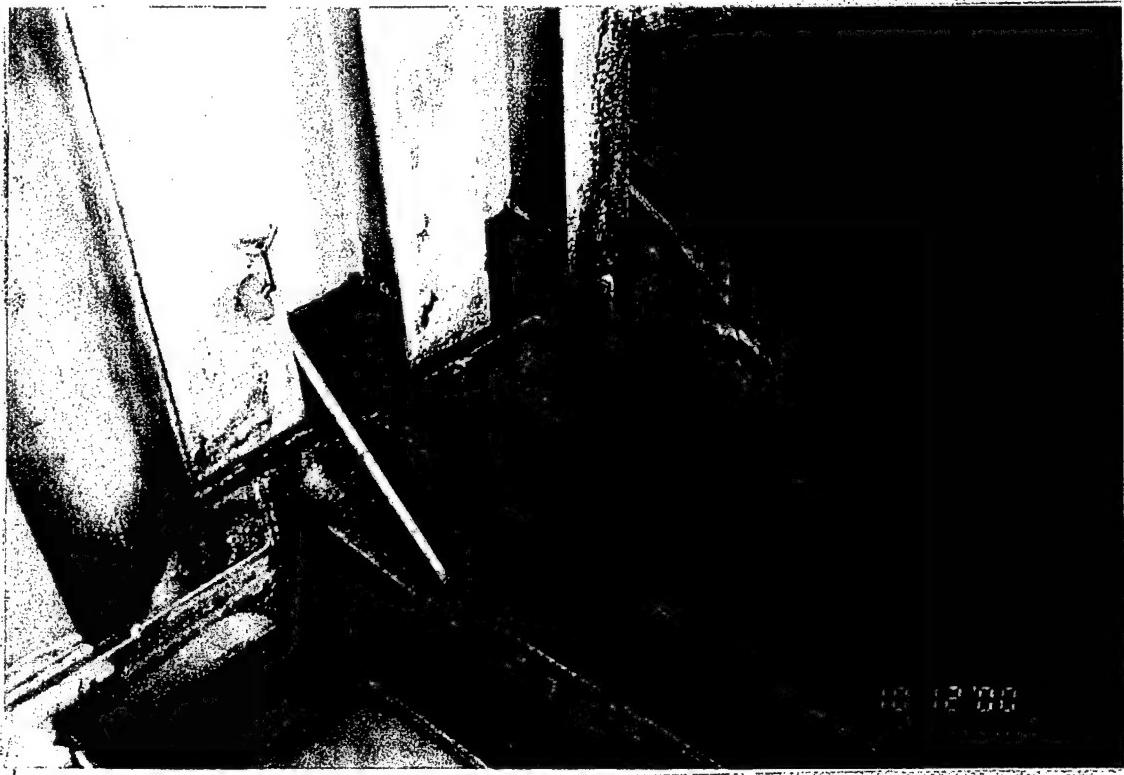


Little
Goose
Dam

10/12/00

4-17

Gate 4
Bottom of bottom horizontal girder,
light corrosion on girder, stiffeners
and purlins.



Little
Goose
Dam

10/12/00

4-18

Gate 4
Bottom horizontal girder, left side.
Standing water, no drainage between
multiple stiffeners, typical. Side seal
leak.



Little
Goose
Dam

10/12/00

4-19

Gate 4
Brace N, left frame. Light corrosion
on brace web and flanges.



Little
Goose
Dam

10/12/00

4-20

Gate 4
Bottom horizontal girder, left side.
Standing water, no drainage between
multiple stiffeners, typical. Side seal
leak.



Little
Goose
Dam

Gate 4
Side seal leak, left side of gate.

10/12/00

4-21

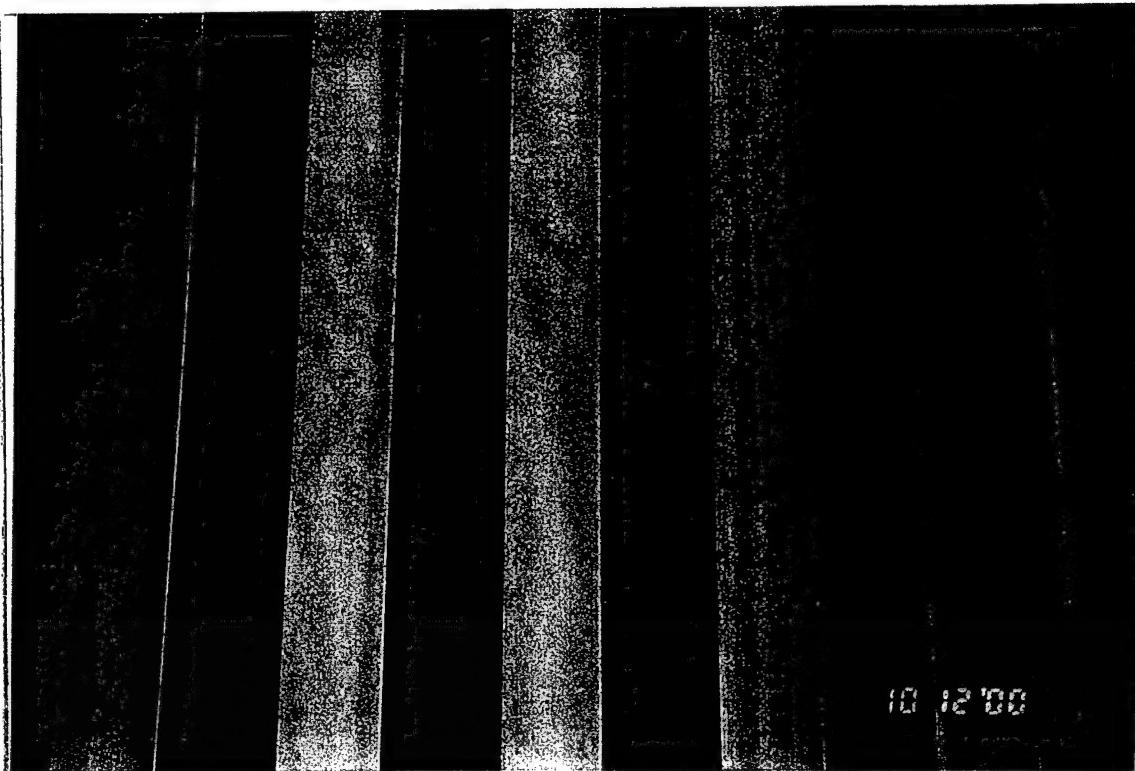


Little
Goose
Dam

Gate 4
Side seal plates, nuts and bolts,
typical.

10/12/00

4-22



10 12'00

Little
Goose
Dam

Gate 4
Downstream side of skin plate.
Evidence of previous repairs.

10/12/00

4-23



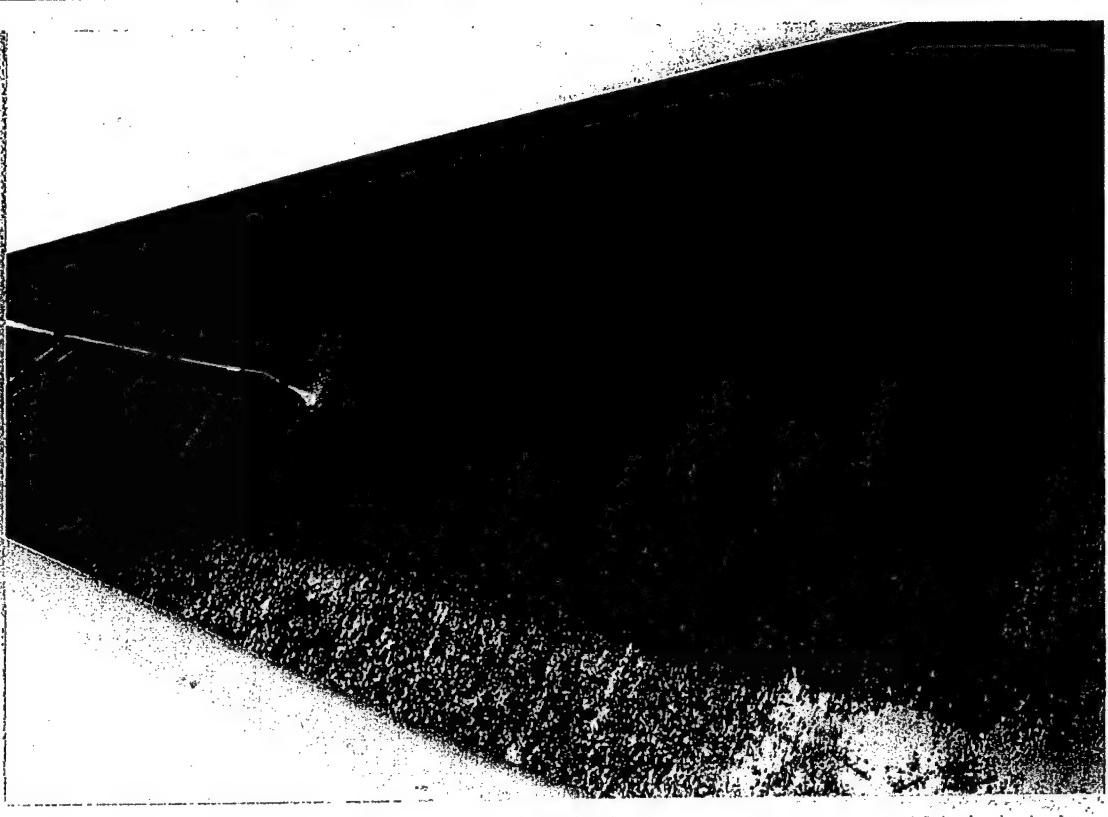
10 13'00

Little
Goose
Dam

Gate 4
Top horizontal girder, left side. 2" to
3" deformation upward in girder
web.

10/19/00

4-24



Little
Goose
Dam

10/19/00

4-25

Gate 4
Waterblasting and skin plate
condition, minimal pitting, typical.

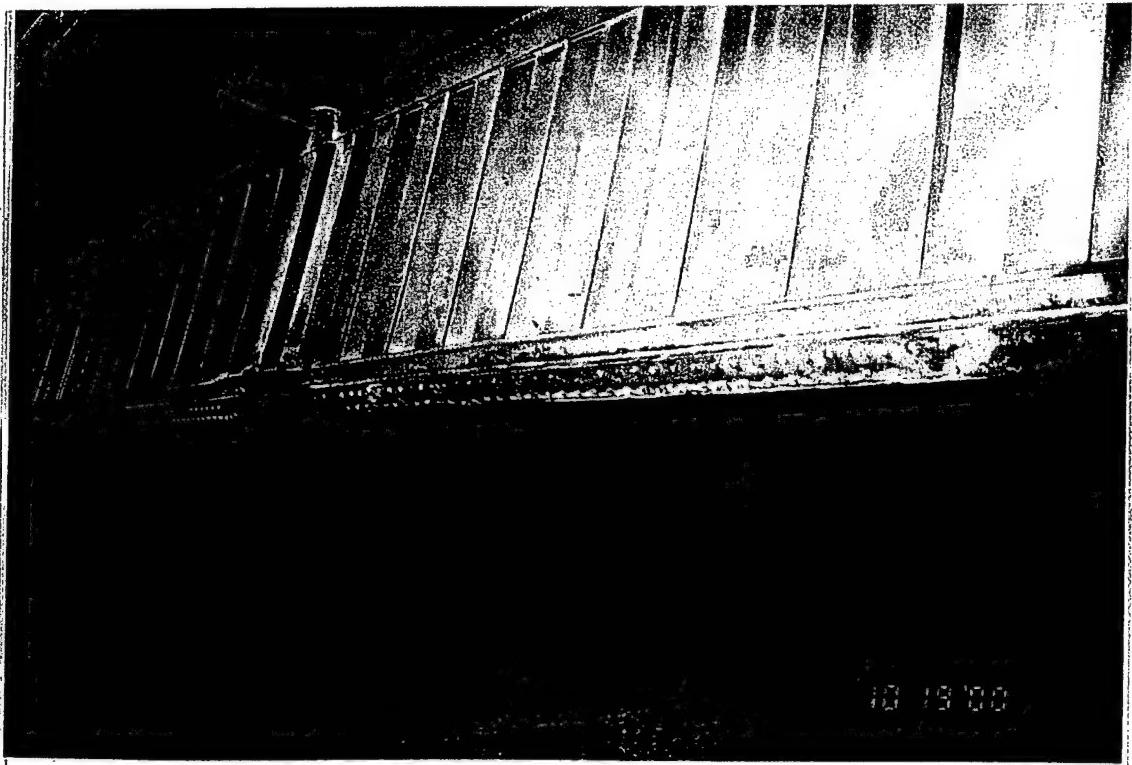


Little
Goose
Dam

10/19/00

4-26

Gate 4
Bottom left corner of gate, typical.



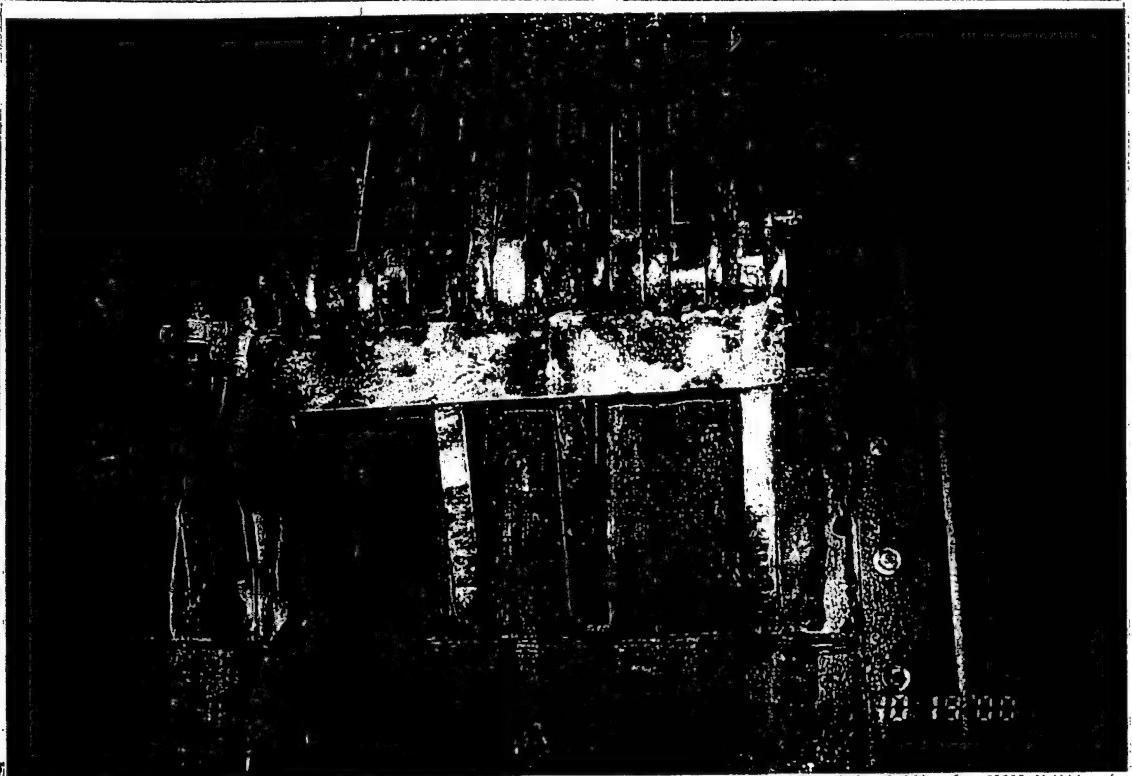
Little
Goose
Dam

10/19/00

4-27

Gate 4
Bottom seal keeper plate, typical.

10/19/00



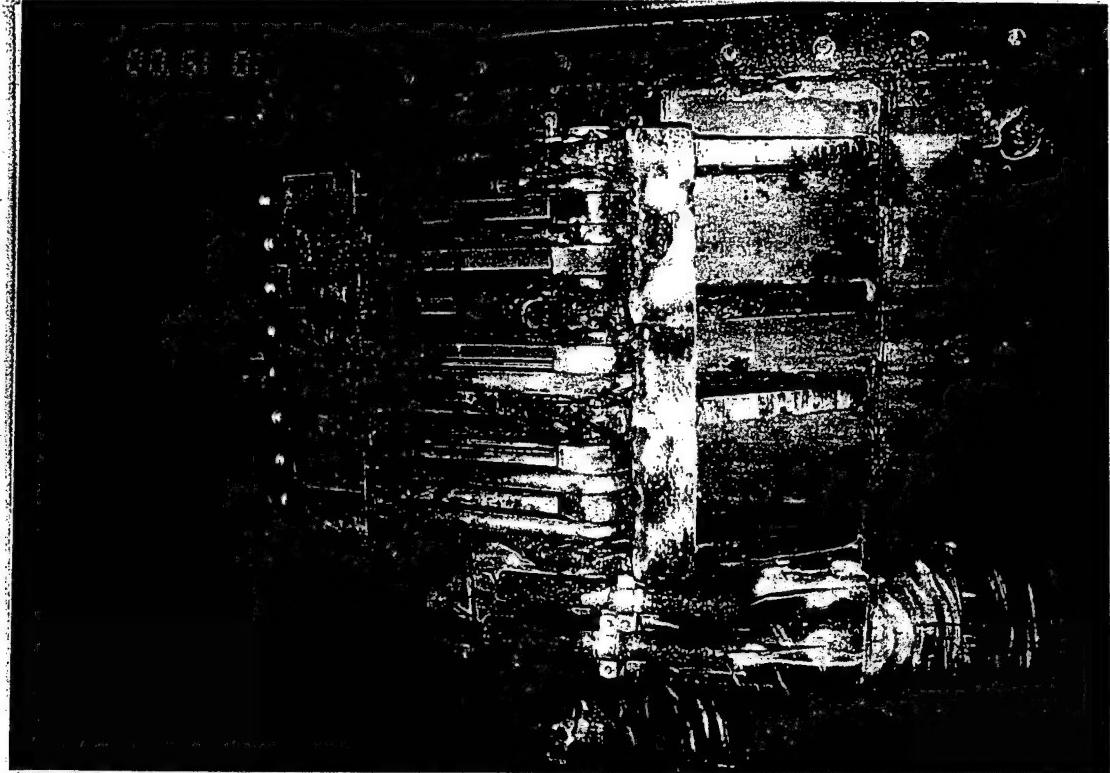
Little
Goose
Dam

10/19/00

4-28

Gate 4
Right hoist connection. Moderate
corrosion on lifting lugs, and plates.

10/19/00



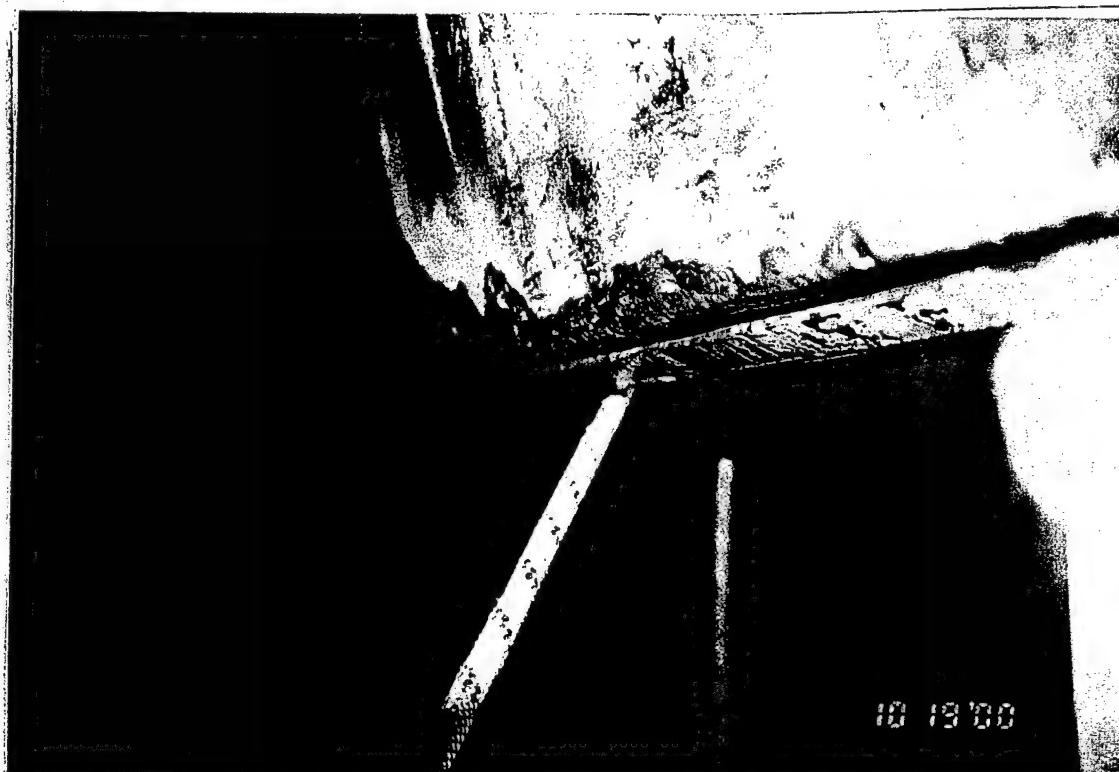
Little
Goose
Dam

10/19/00

4-29

Gate 4

Right hoist connection. Moderate
corrosion on lifting lugs, and plates.



Little
Goose
Dam

10/19/00

4-30

Gate 4

Bottom seal and bottom upstream
side of skin plate. Moderate
corrosion at bottom edge of skin
plate.



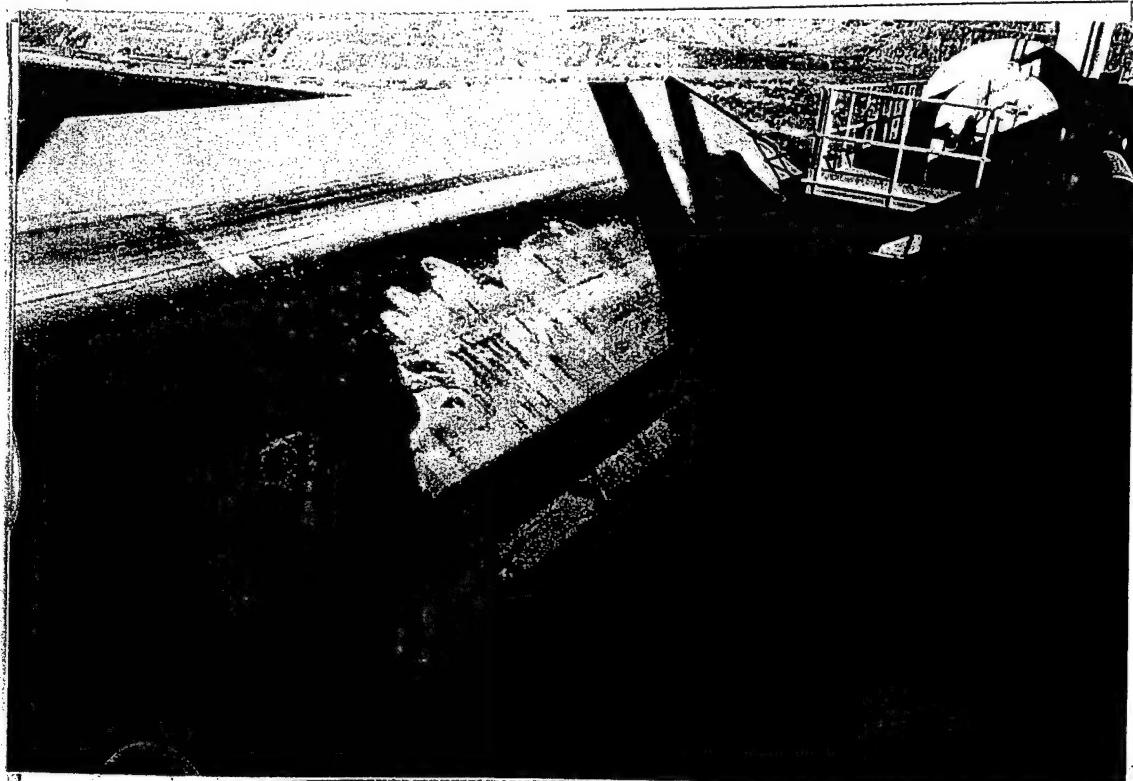
10/19/00

Little
Goose
Dam

Gate 4
Bottom seal, typical.

10/19/00

4-31

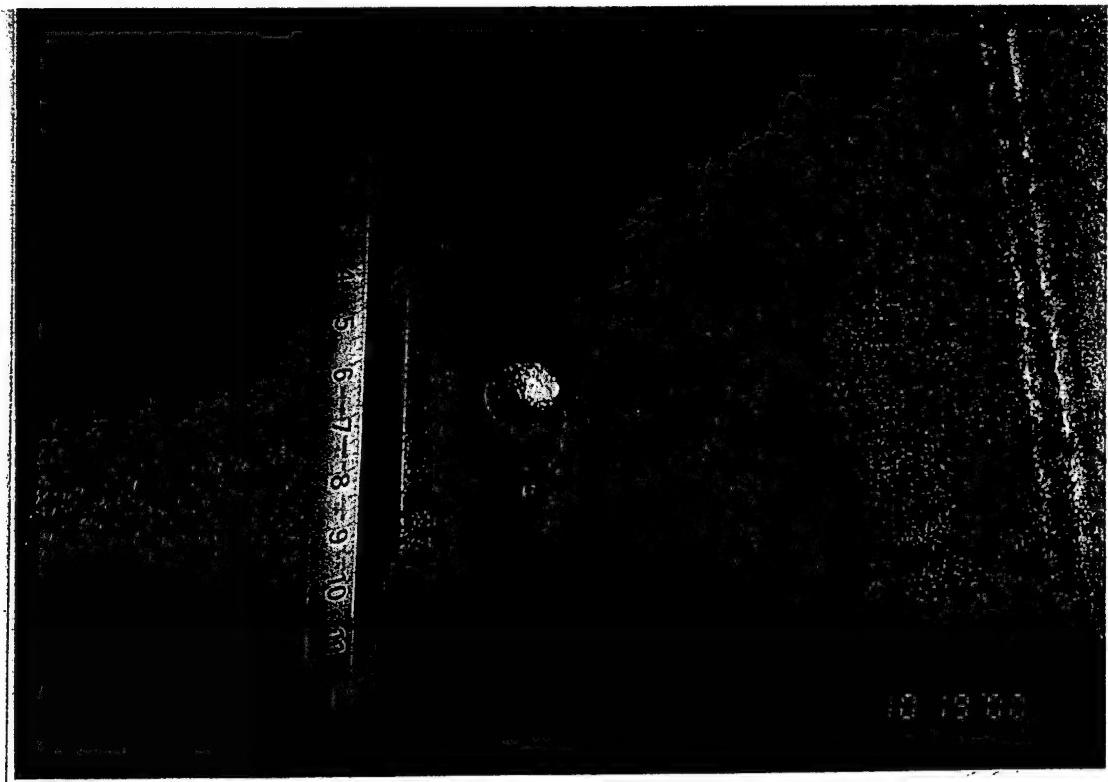


Little
Goose
Dam

Gate 4
Skin plate condition, minimal pitting,
typical.

10/19/00

4-32



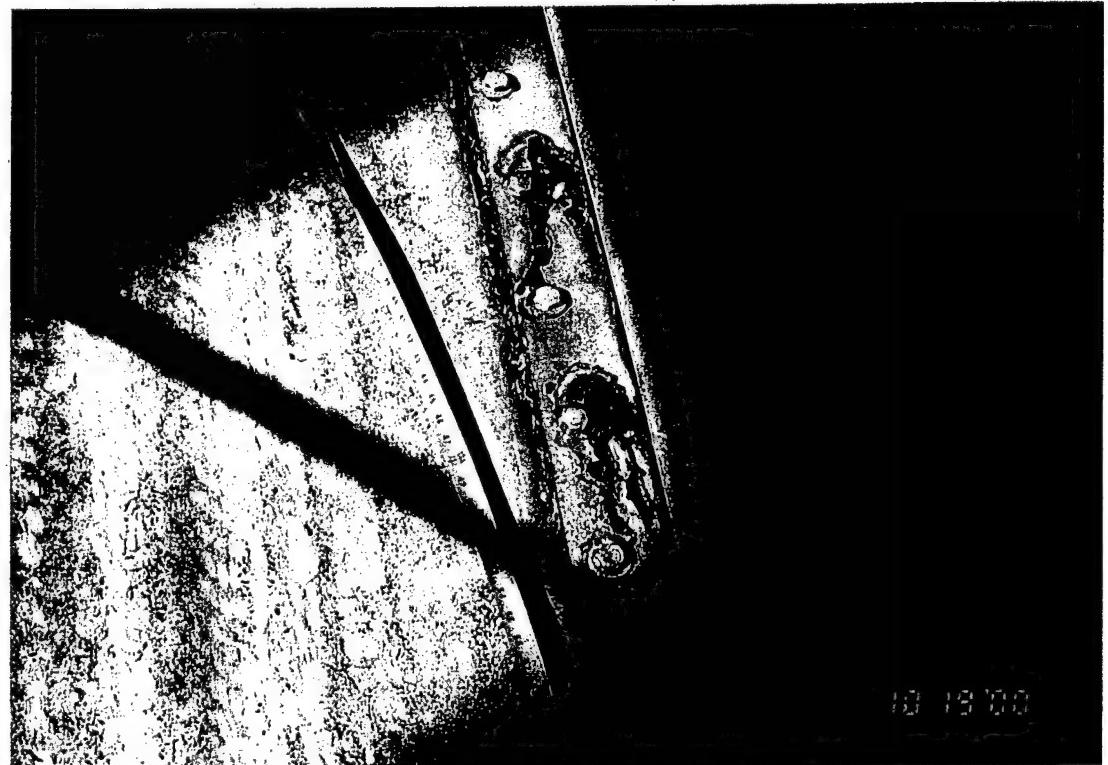
Little
Goose
Dam

Gate 4
Skin plate pitting, where present,
typical.

10/19/00

4-33

10 19 00



10 19 00

Little
Goose
Dam

Gate 4
Side seal angles, wear plate and side
seal, typical.

10/19/00

4-34

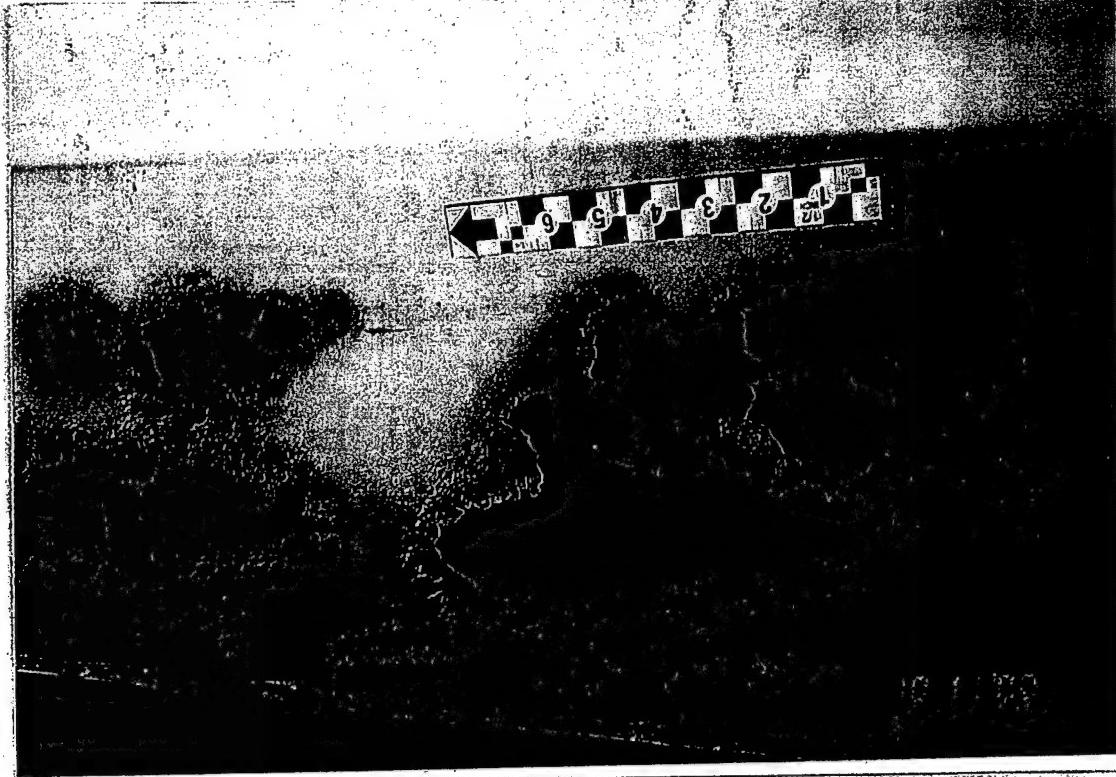


Little
Goose
Dam

10/19/00

4-35

Gate 4
Side seal angles, side seal, and side
seal, typical

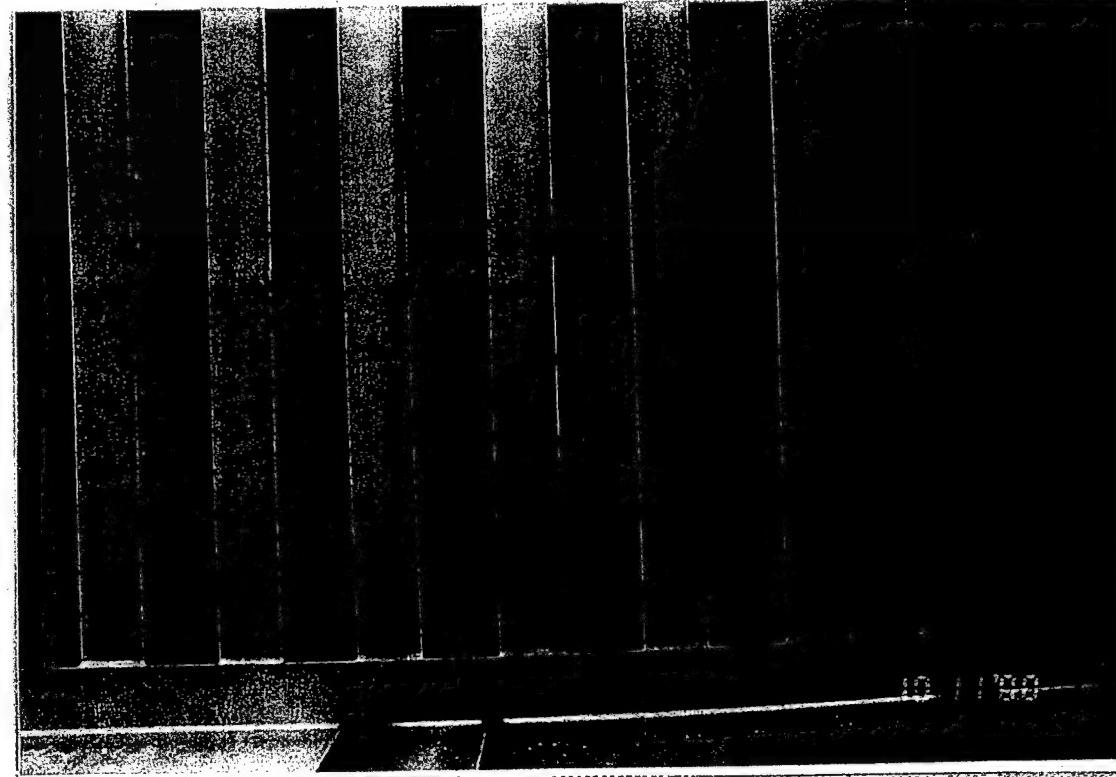


Little
Goose
Dam

10/11/00

5-1

Gate 5
Downstream side of skin plate, left
side of gate, above top horiz. girder.
Peeling paint, light corrosion.
Appears to be possible paint blister
due to upstream skin plate welding.



Little
Goose
Dam

10/11/00

5-2

Gate 5
Downstream side of skin plate, left
side of gate, above top horiz. girder.
Peeling paint, light corrosion.
Appears to be possible paint blister
due to upstream skin plate welding.

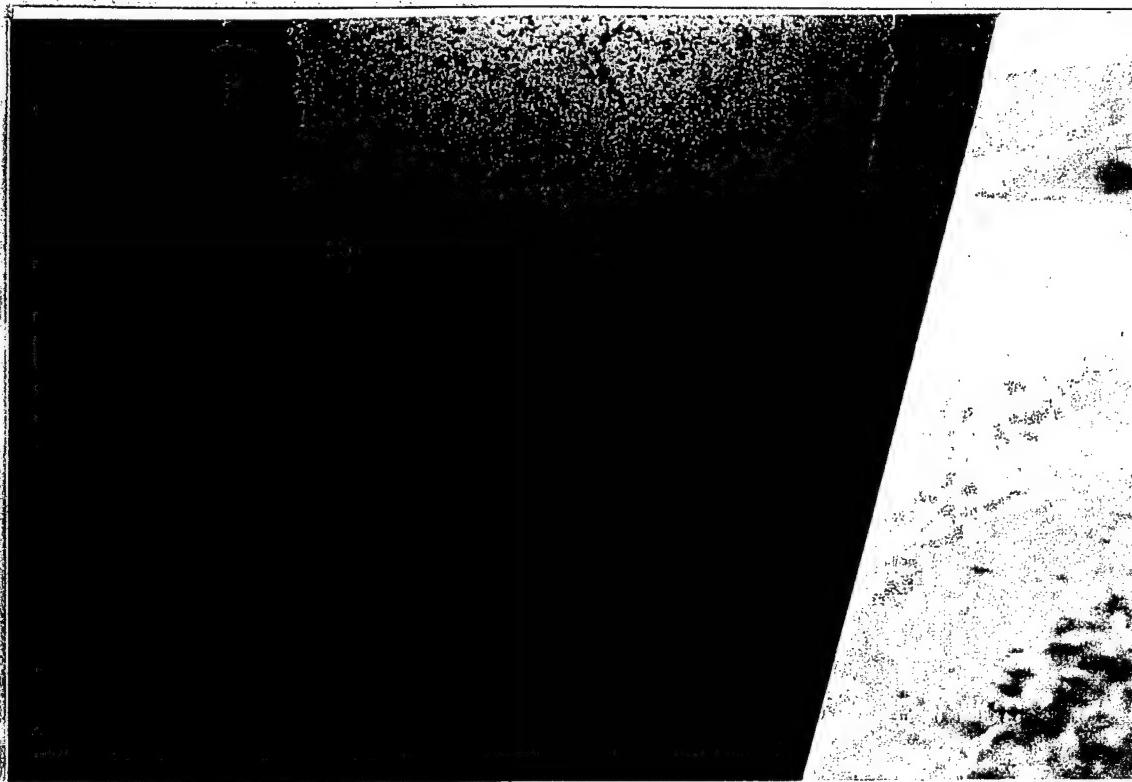


Little
Goose
Dam
10/11/00

5-3

Gate 5
Top horizontal girder, left side of
gate. Light corrosion on girder web,
purlins, braces.

10/11/00

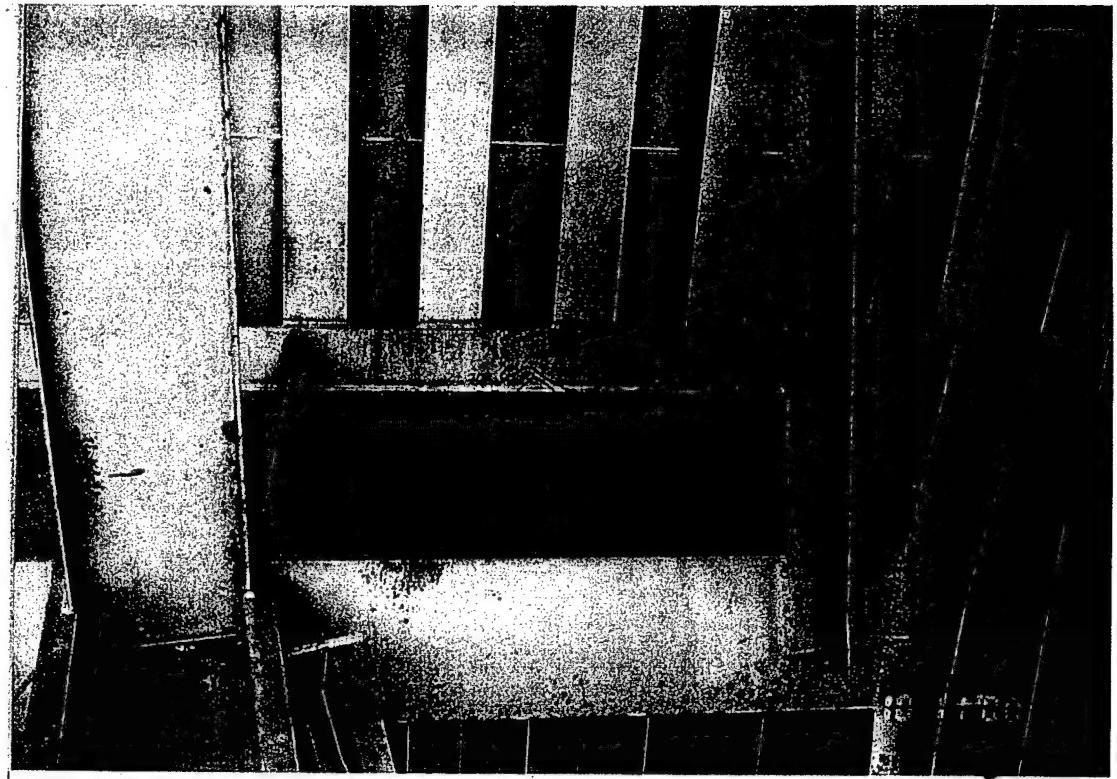


Little
Goose
Dam

10/11/00

5-4

Gate 5
Left frame, Brace D. light corrosion
and brace.



Little
Goose
Dam

10/11/00

5-5

Gate 5
Middle horizontal girder, left end.
Light corrosion on girder, braces and
skin plate.



Little
Goose
Dam

10/11/00

5-6

Gate 5
Downstream side of skin plate, left
side of gate, above middle horiz.
girder. Peeling paint, light corrosion.
Appears to be possible paint blister
due to upstream skin plate welding.



10/11/00

Little
Goose
Dam
10/11/00

5-7

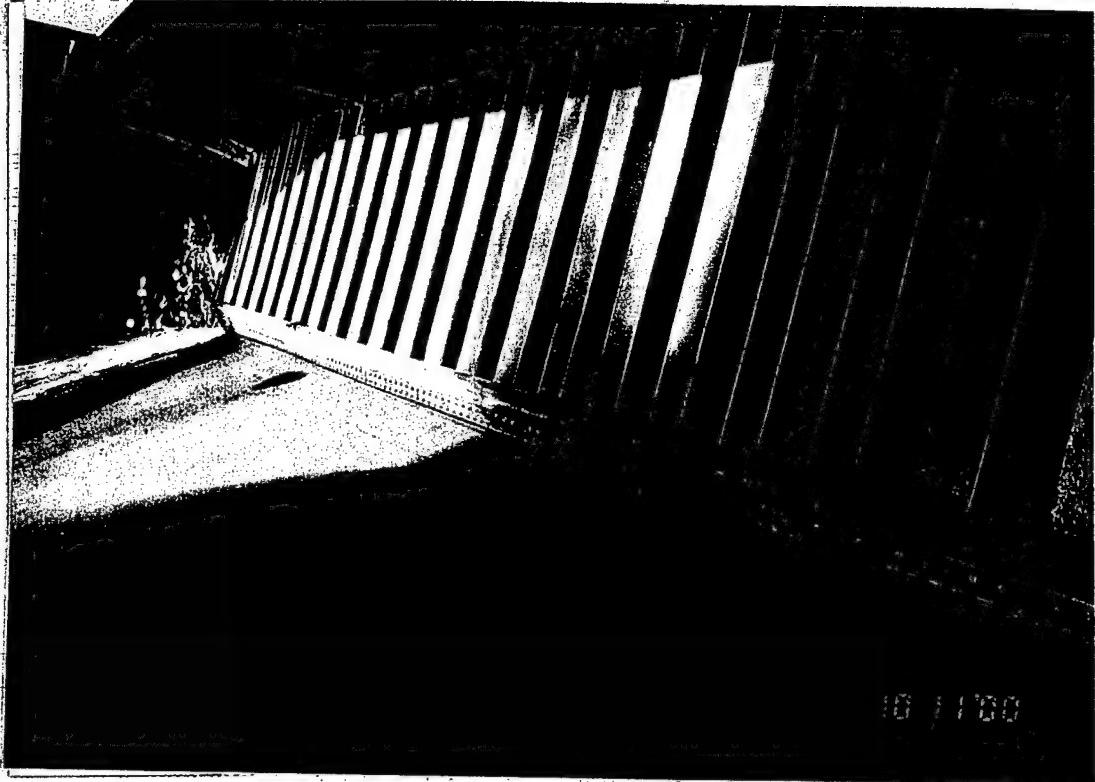
Gate 5
Bottom horizontal girder, left end.
Standing water, no drainage between
multiple stiffeners, typical.



Little
Goose
Dam
10/11/00

5-8

Gate 5
Let frame, Brace J. Light corrosion
on bottom radial strut and brace.



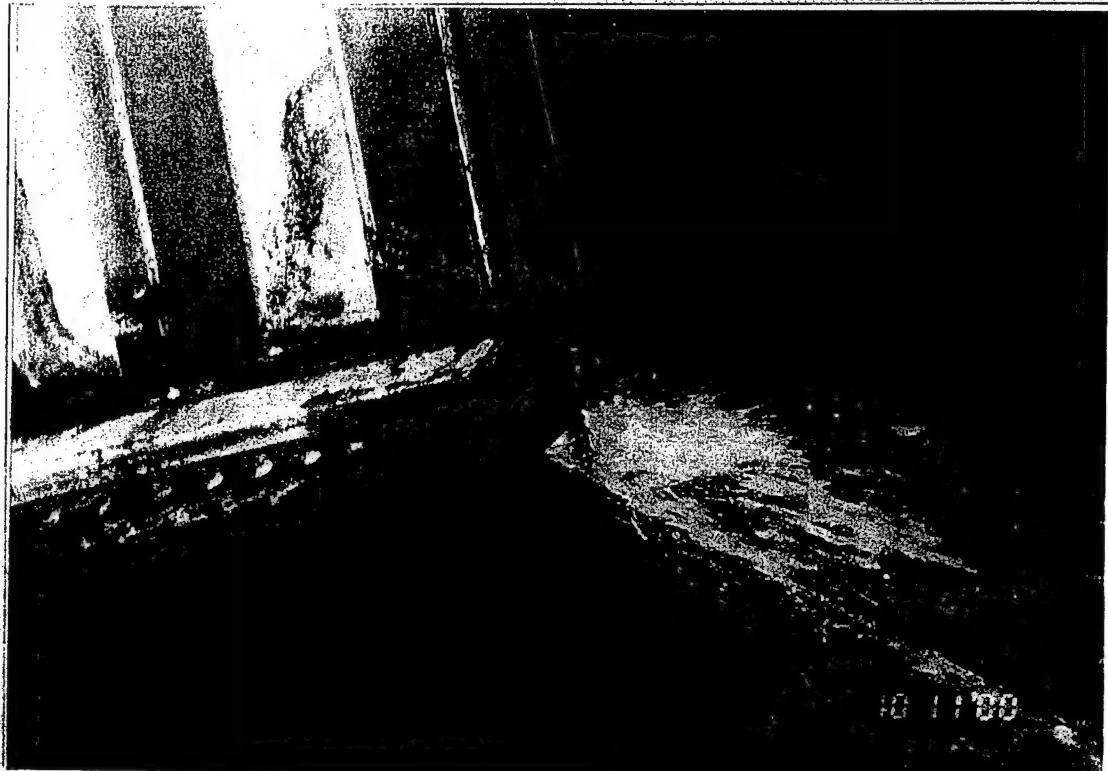
10/11/00

Little
Goose
Dam

10/11/00

5-9

Gate 5
Leak at center construction joint in
spillway monolith.



10/11/00

Little
Goose
Dam
10/11/00
5-10

Gate 5
Bottom left corner of gate, bottom
seal leak. Bottom seal closure plate.
Standing water between closure plate,
purlin webs and skinplate, typical.



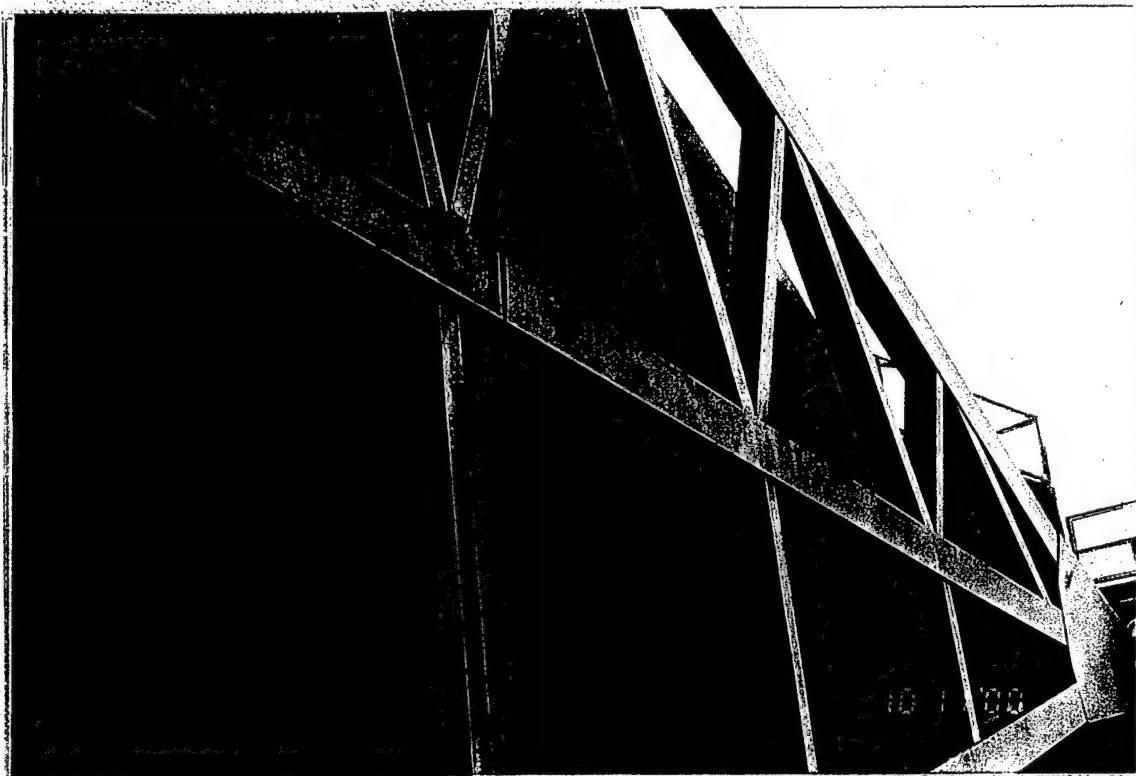
Little
Goose
Dam

10/11/00

5-11

Gate 5

Bottom seal closure plate. Standing water between closure plate, purlin webs and skinplate, typical.

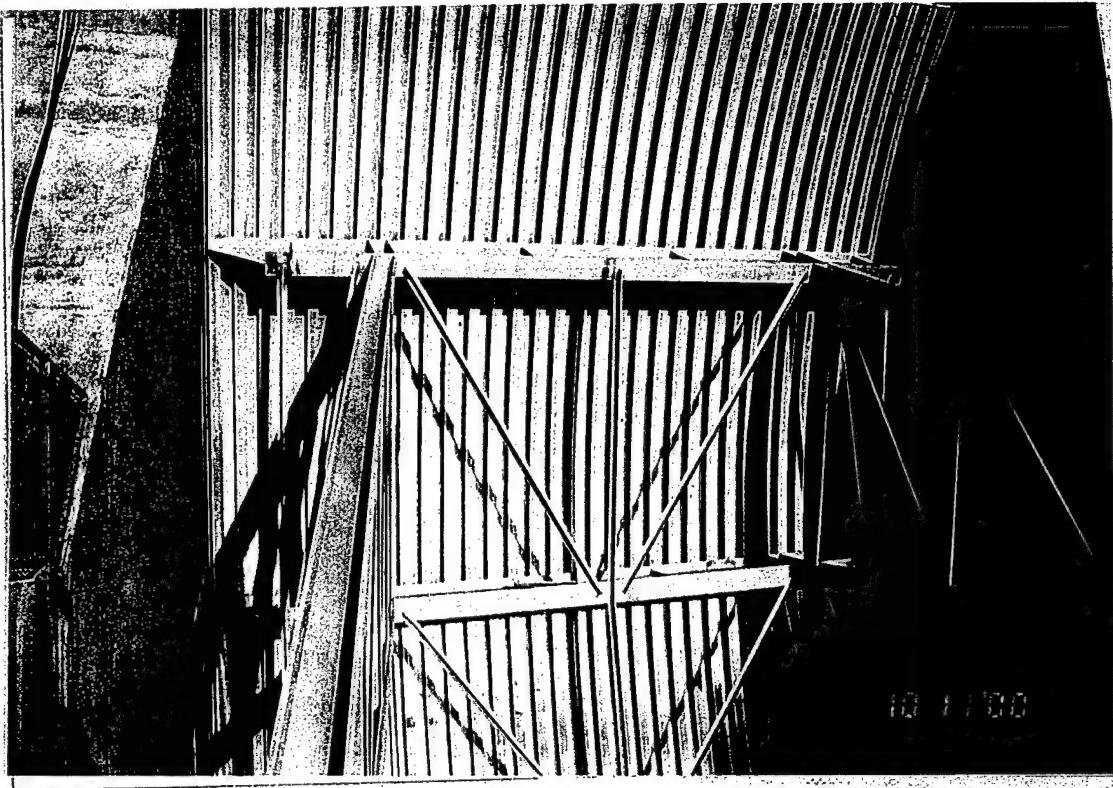


Little
Goose
Dam

10/11/00

5-12

Gate 5
Left frame, typical.

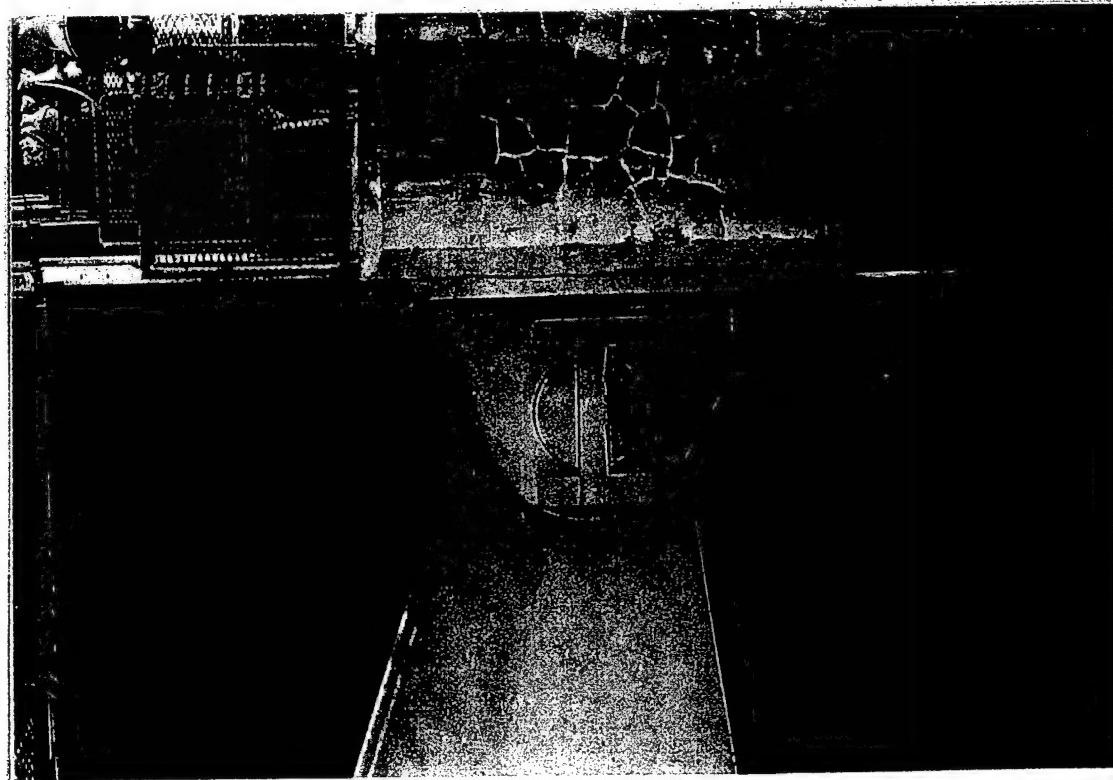


Little
Goose
Dam

10/11/00

5-13

Gate 5
Gate face, typical.

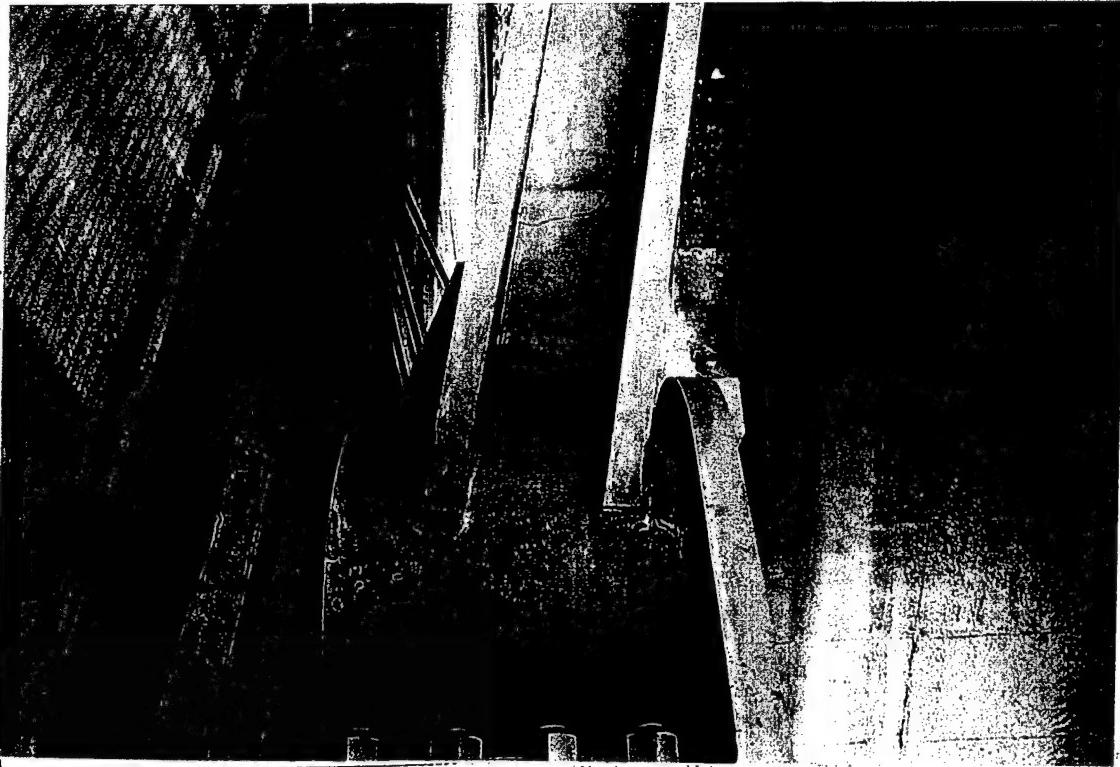


Little
Goose
Dam

10/11/00

5-14

Gate 5
Left trunnion block. Light cracking
in concrete.



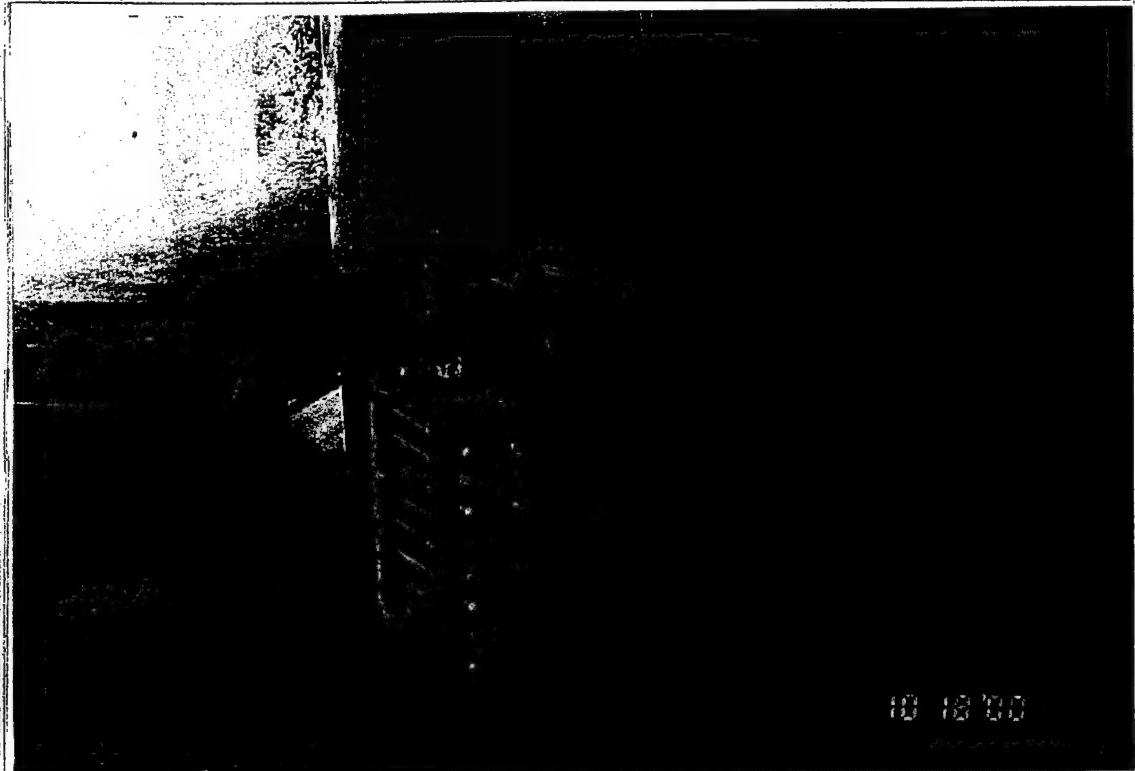
Little
Goose
Dam

10/11/00

5-15

Gate 5

Top of right trunnion. Standing
water due to inadequate drainage in
top radial strut web.



10-18 '00

CH 10-18-00

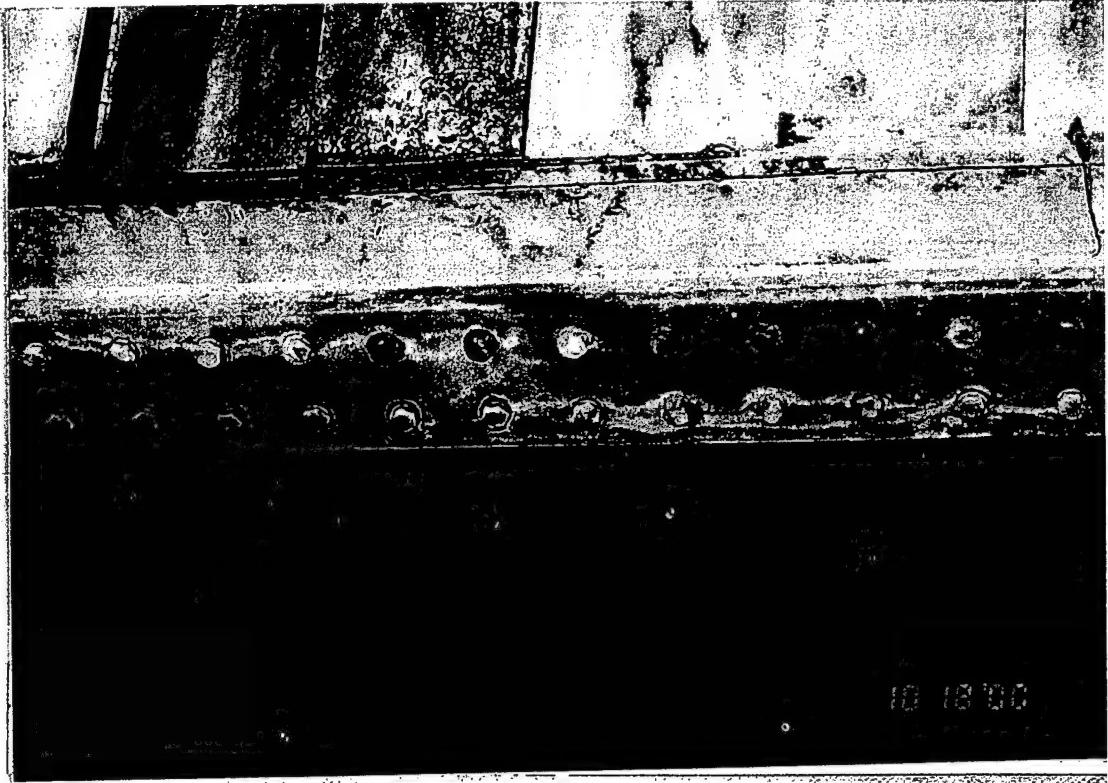
Little
Goose
Dam

10/18/00

5-16

Gate 5

Top of right hoist connection. Light
corrosion on lifting lugs and plates.



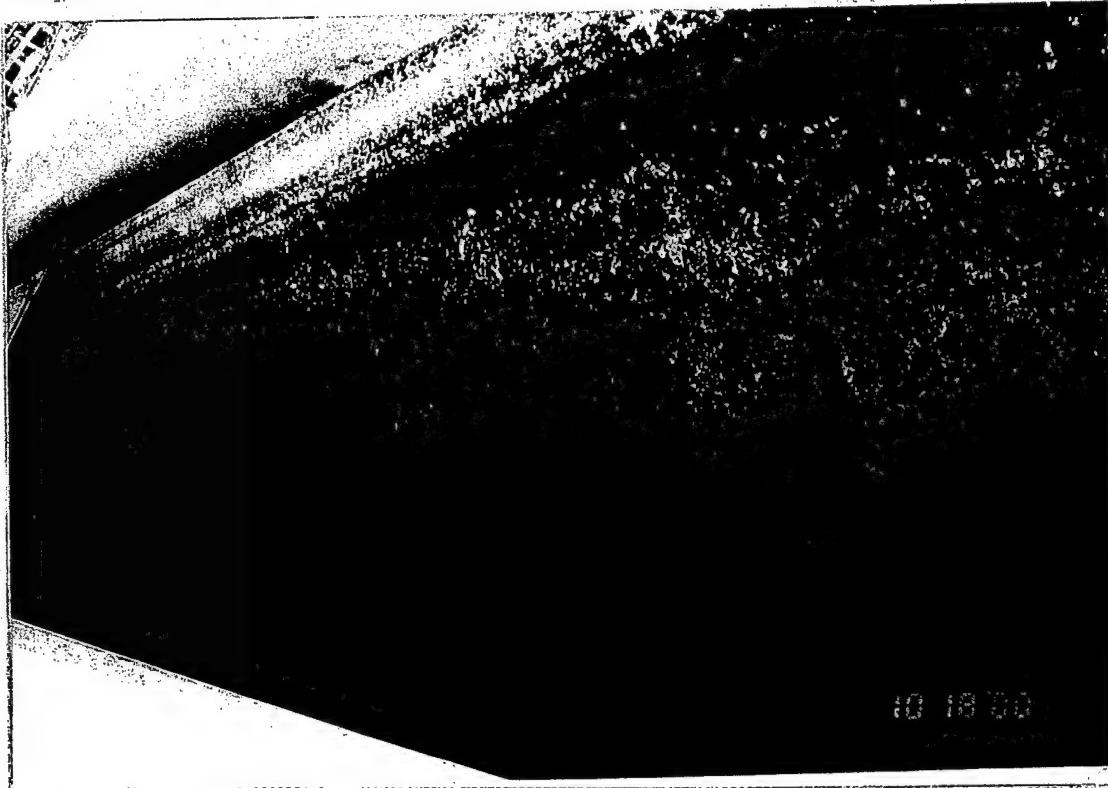
10 18 '00

Little
Goose
Dam

Gate 5

10/11/00

5-17



10 18 '00

Little
Goose
Dam

Gate 5

10/11/00

5-18

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

10 11 12

Little
Goose
Dam
10/11/00
5-19

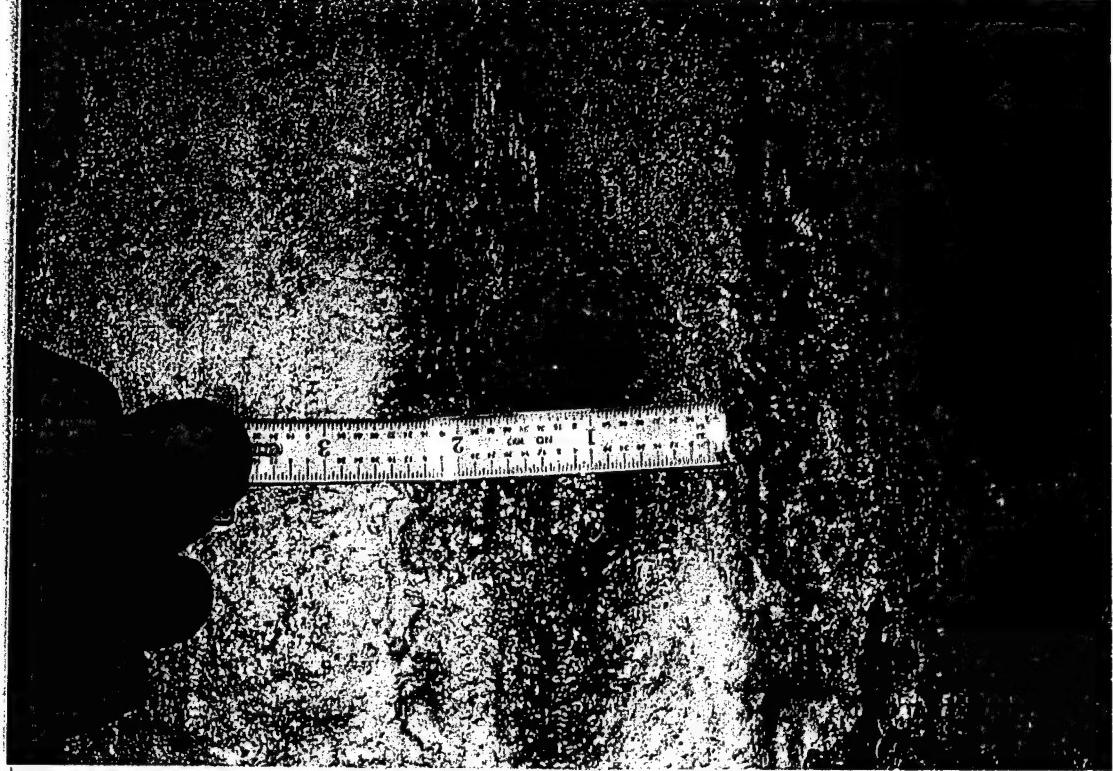
Gate 5



10 11 12

Little
Goose
Dam
10/11/00
5-20

Gate 5

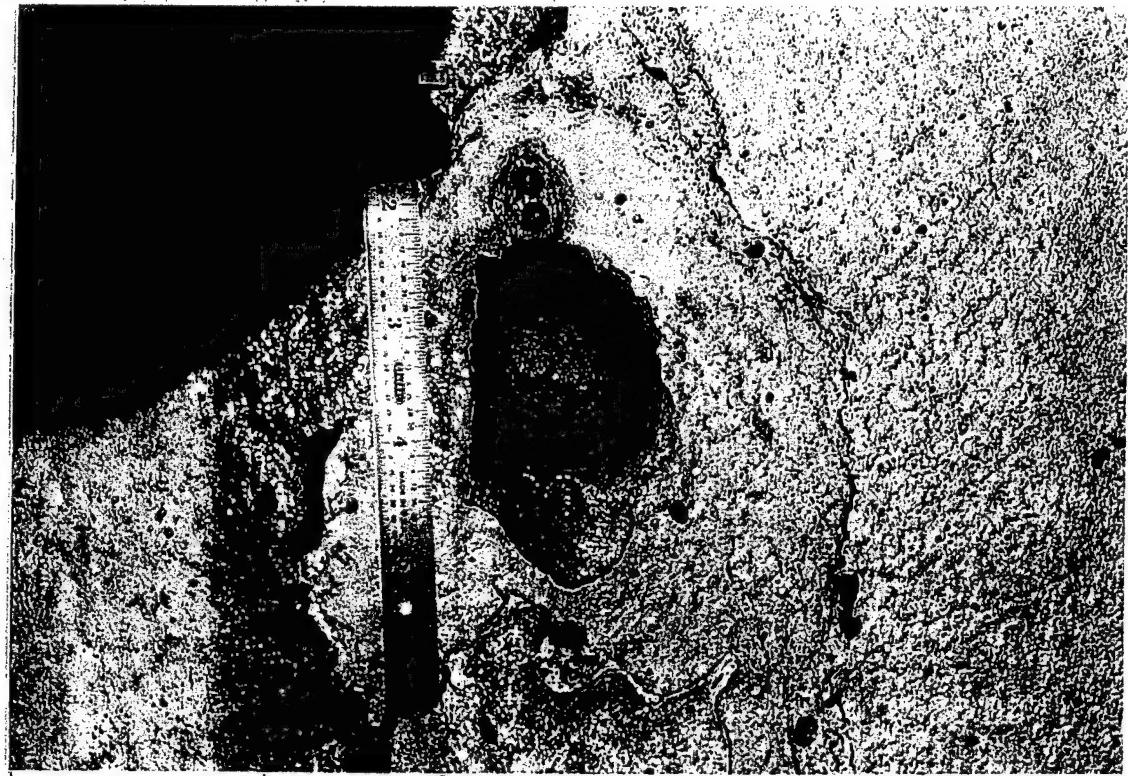


Little
Goose
Dam

10/18/00

5-21

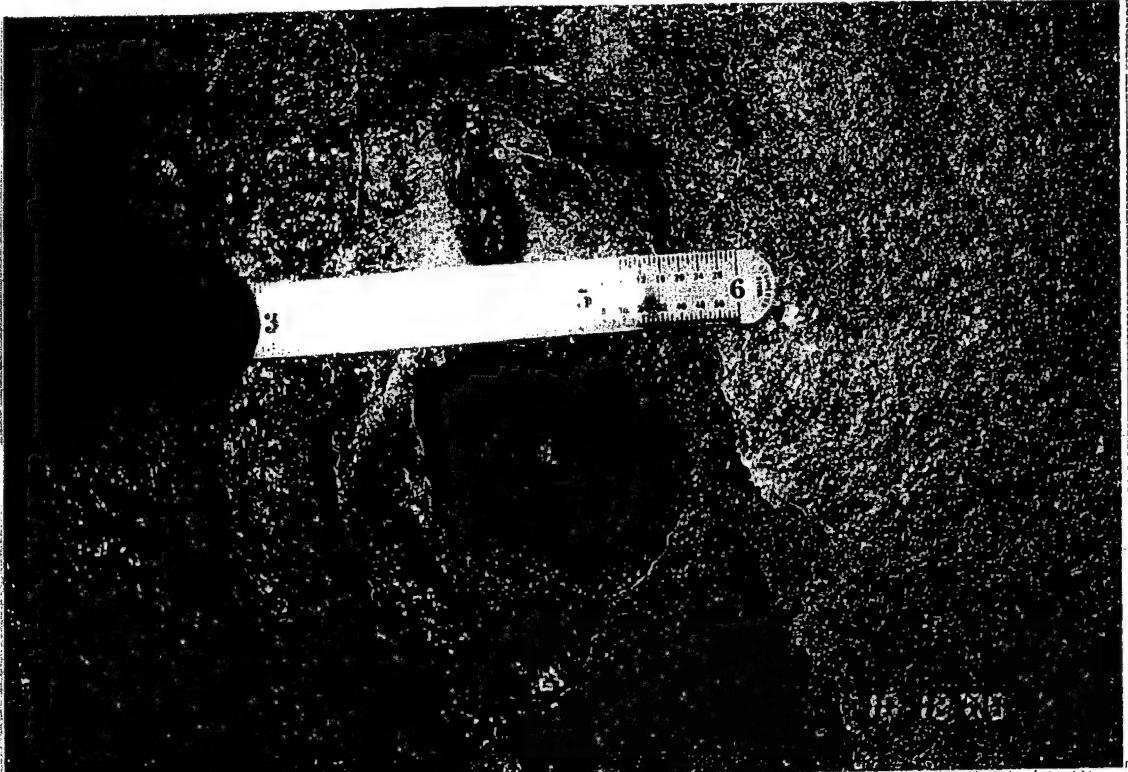
Gate 5
Bottom seal keeper plate, typical.



Little
Goose
Dam
10/18/00

5-22

Gate 5
Waterblasting and typical skin plate
condition. Minimal pitting on skin
plate (except for wear plates).



Little
Goose
Dam

10/18/00

5-23

Gate 5

Heavy pitting on wear plate, typical.



Little
Goose
Dam

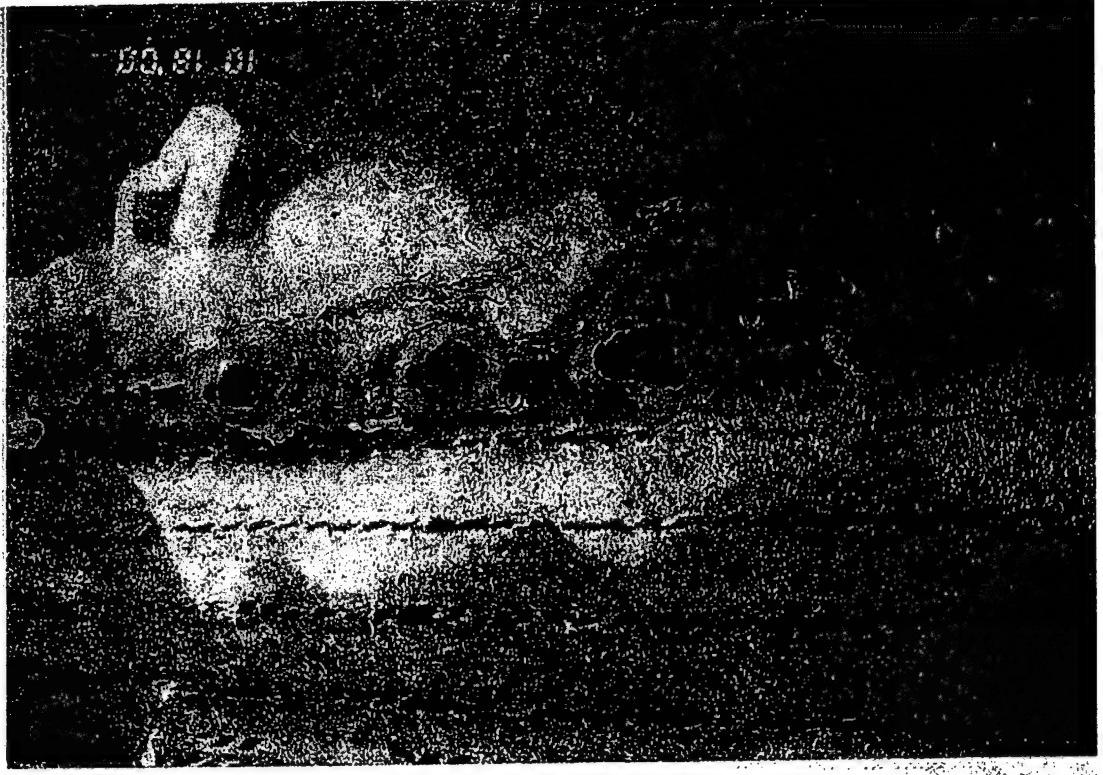
10/18/00

5-24

Gate 5

Heavy pitting on wear plate, typical.

50.81.01



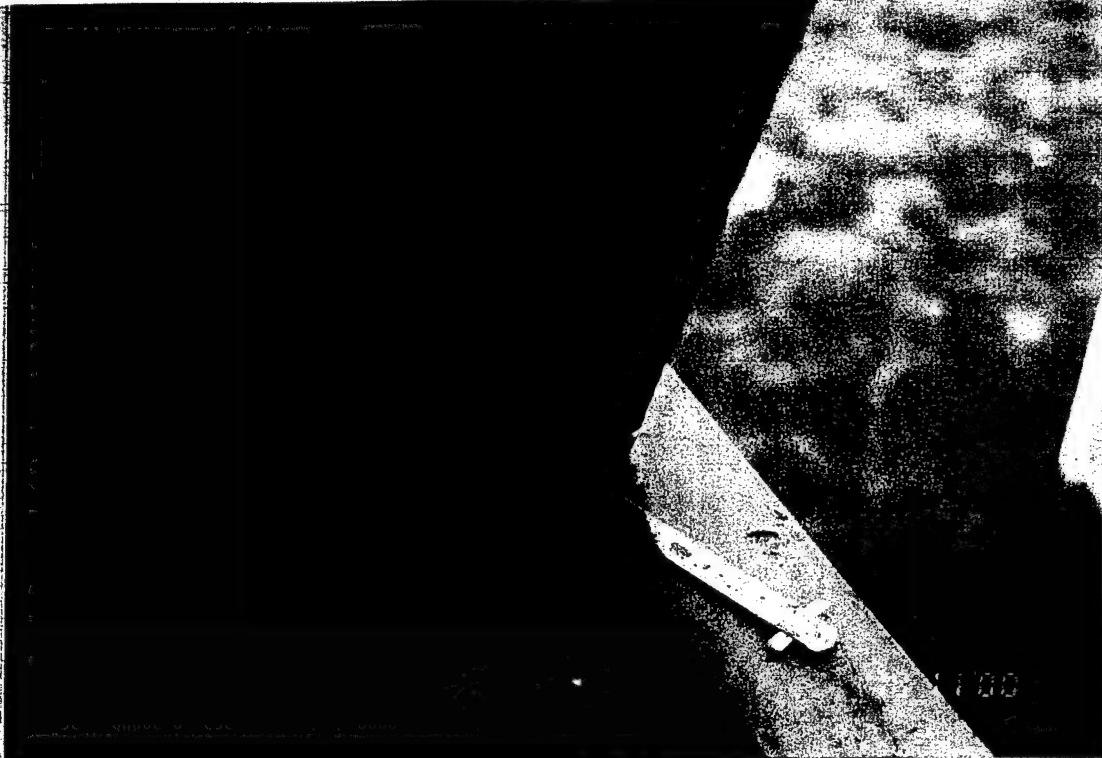
Little
Goose
Dam

10/18/00

5-25

Gate 5

Heavy pitting on wear plate, typical.



Little
Goose
Dam

Gate 6
Left frame, Brace B. Light corrosion
on brace (see photo 6-2).

10/11/00

6-1



Little
Goose
Dam

Gate 6
Left frame, Brace B. Light corrosion
on brace.

10/11/00

6-2



10/11/00

Little
Goose
Dam
10/11/00

6-3

Gate 6
Downstream side of skin plate, left
side of gate, above middle horizontal
girder. Apparent skin plate repair.



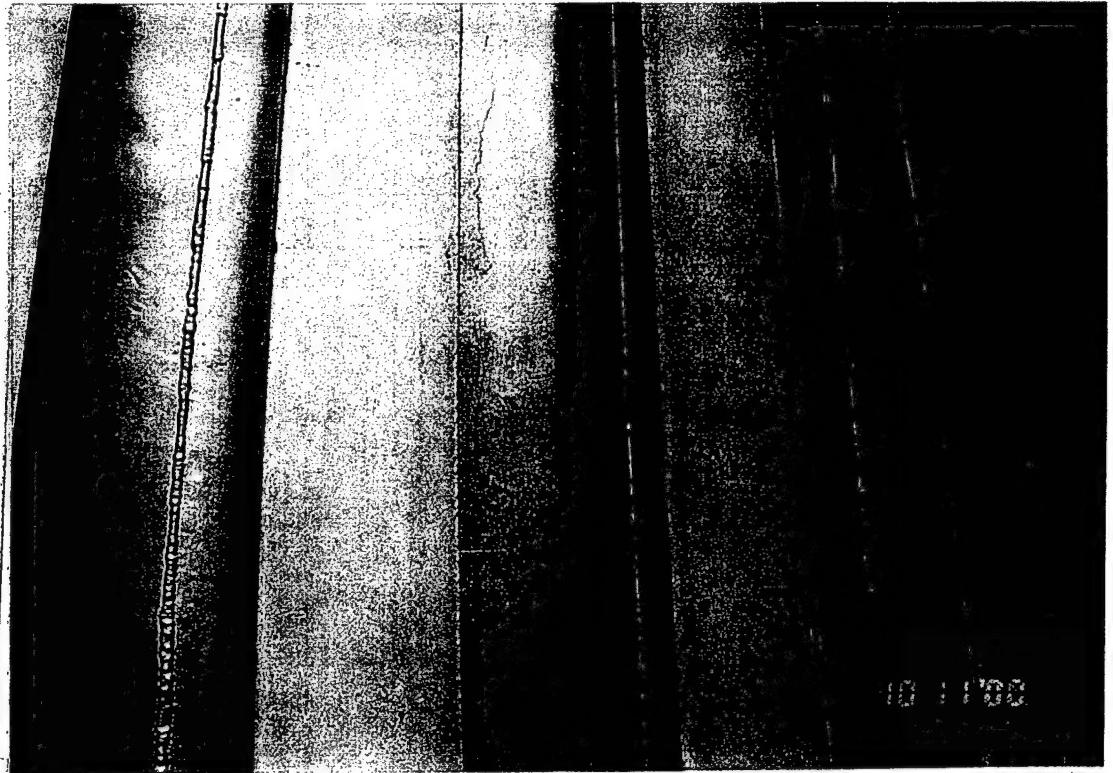
10/11/00

Little
Goose
Dam

10/11/00

6-4

Gate 6
Left frame, brace D. Light corrosion.

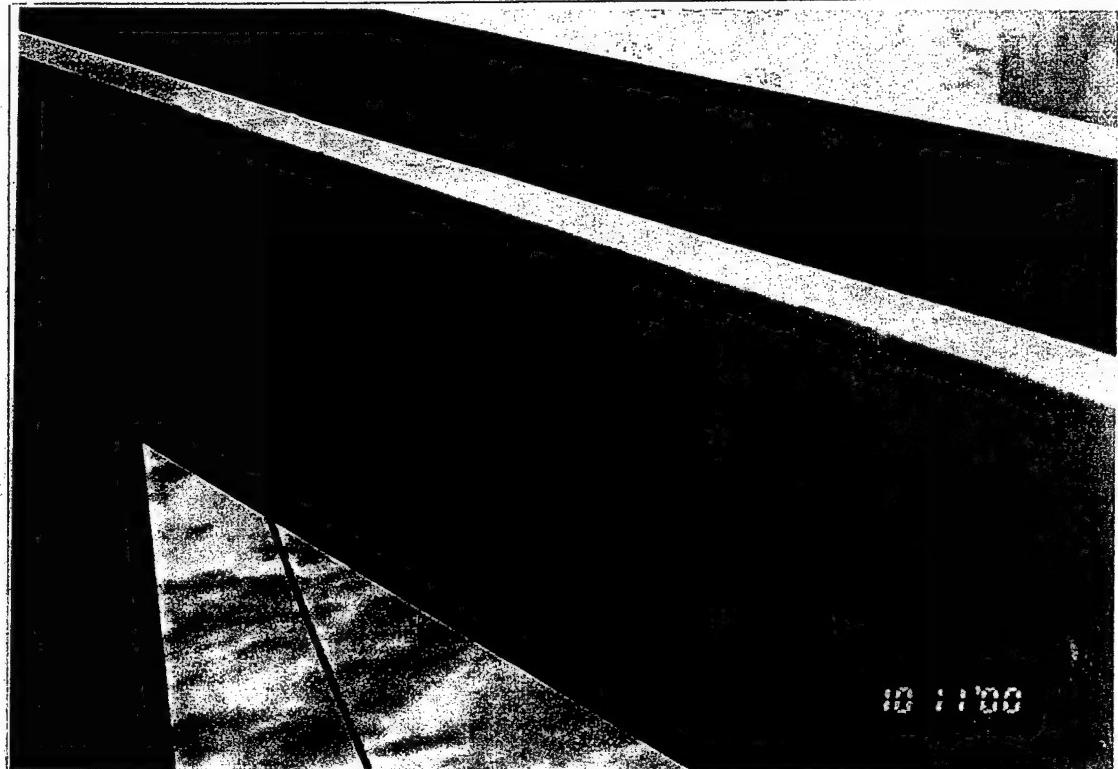


10/11/00

Little
Goose
Dam
10/11/00
6-5

Gate 6

Downstream side of skin plate, left
side of gate, above middle horizontal
girder. Discolorization due to
apparent repainting and possible skin
plate repair.



10/11/00

Little
Goose
Dam
10/11/00
6-6

Gate 6

Left frame, middle radial strut. Light
pitting on outside flange.

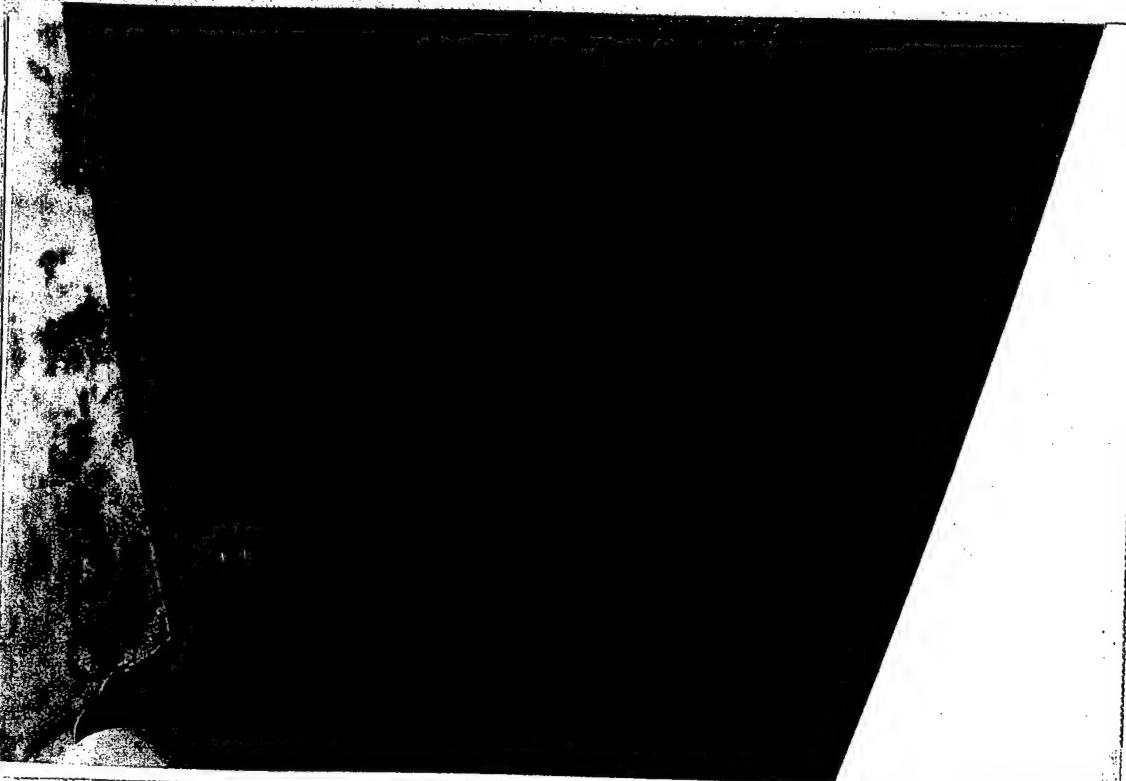


10/11/00

Little Goose Dam	Gate 6 Downstream side of skin plate, apparent skin plate repair grinding.
------------------------	---

10/11/00

6-7



10/11/00

Little Goose Dam	Gate 6 Light corrosion and debris coating on braces, typical.
------------------------	--

6-8

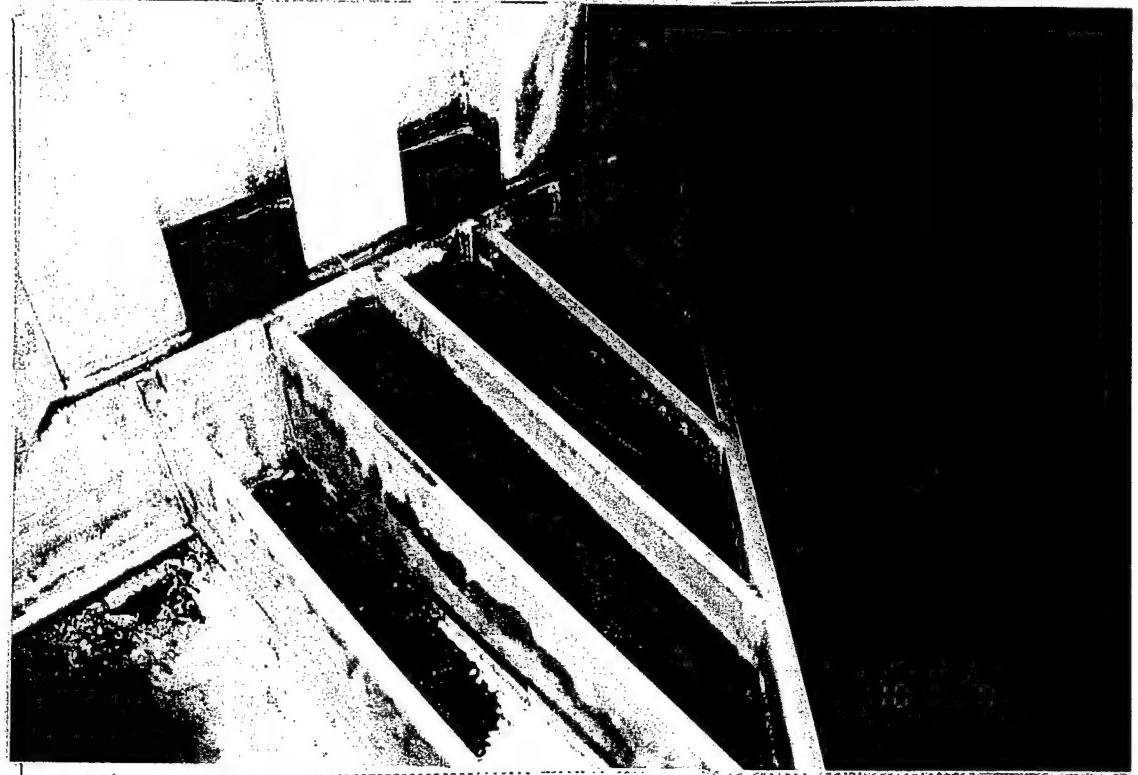


Little
Goose
Dam

10/11/00

6-9

Gate 6
Gate face and spillway, typical. Leak
at center construction joint in spillway
monolith.



Little
Goose
Dam

10/11/00

6-10

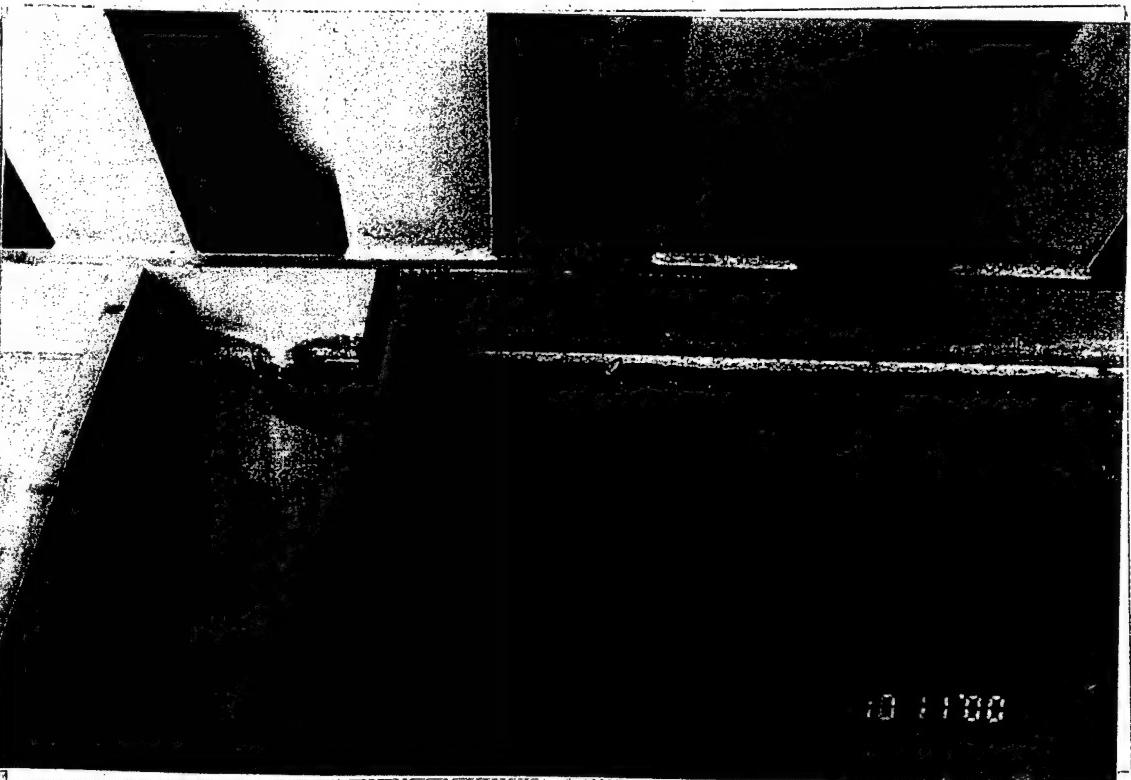
Gate 6
Bottom horizontal girder. Standing
water, no drainage between multiple
stiffeners, typical. Horizontal girder
to skin plate stiffeners, standing
water, debris and no drainage.



Little
Goose
Dam
10/11/00
6-11

Gate 6

Bottom horizontal girder. Standing water, no drainage between multiple stiffeners, typical. Horizontal girder to skin plate stiffeners, standing water, debris and no drainage.



Little
Goose
Dam
10/11/00

Gate 6

Bottom horizontal girder. Evidence of standing water on girder web and flange.



Little
Goose
Dam
10/11/00

6-13

Gate 6
Bottom seal keeper plate, typical.
Bottom seal closure plate, standing
water between closure plate, purlin
webs and skinplate, typical.



Little
Goose
Dam

10/11/00

6-14

Gate 6
Leak at center construction joint in
spillway monolith.



10/11/00

Little
Goose
Dam

10/11/00

6-15

Gate 6

Bottom seal closure plate, standing
water between closure plate, purlin
webs and skinplate, typical.



10/11/00

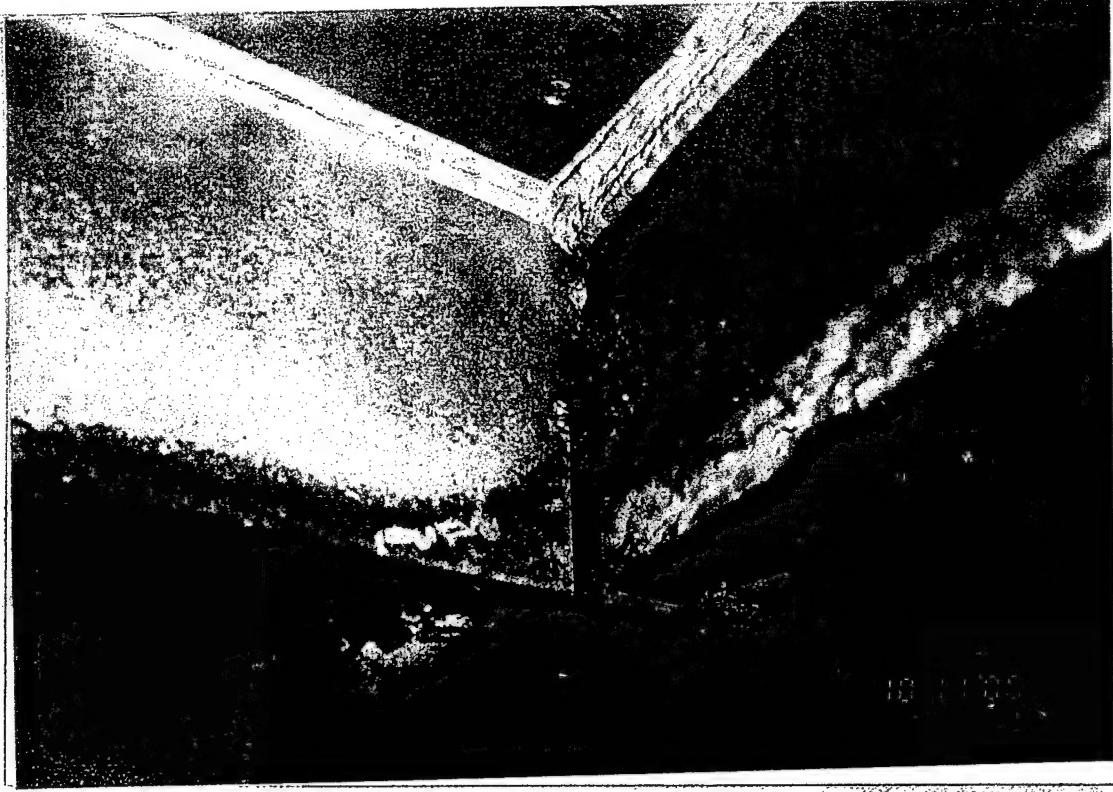
Little
Goose
Dam

10/11/00

6-16

Gate 6

Bottom of bottom horizontal girder
at radial strut connection and girder
drain hole. Light corrosion on girder
web and stiffeners.



Little
Goose
Dam

10/11/00

6-17

Gate 6
Bottom of bottom horizontal girder
at radial strut connection and girder
drain hole. Light corrosion on girder
web and stiffeners.



Little
Goose
Dam

10/11/00

6-18

Gate 6
Leak at center construction joint in
spillway monolith. Light corrosion
on bottom seal keeper plate.



Little
Goose
Dam
10/11/00

6-19

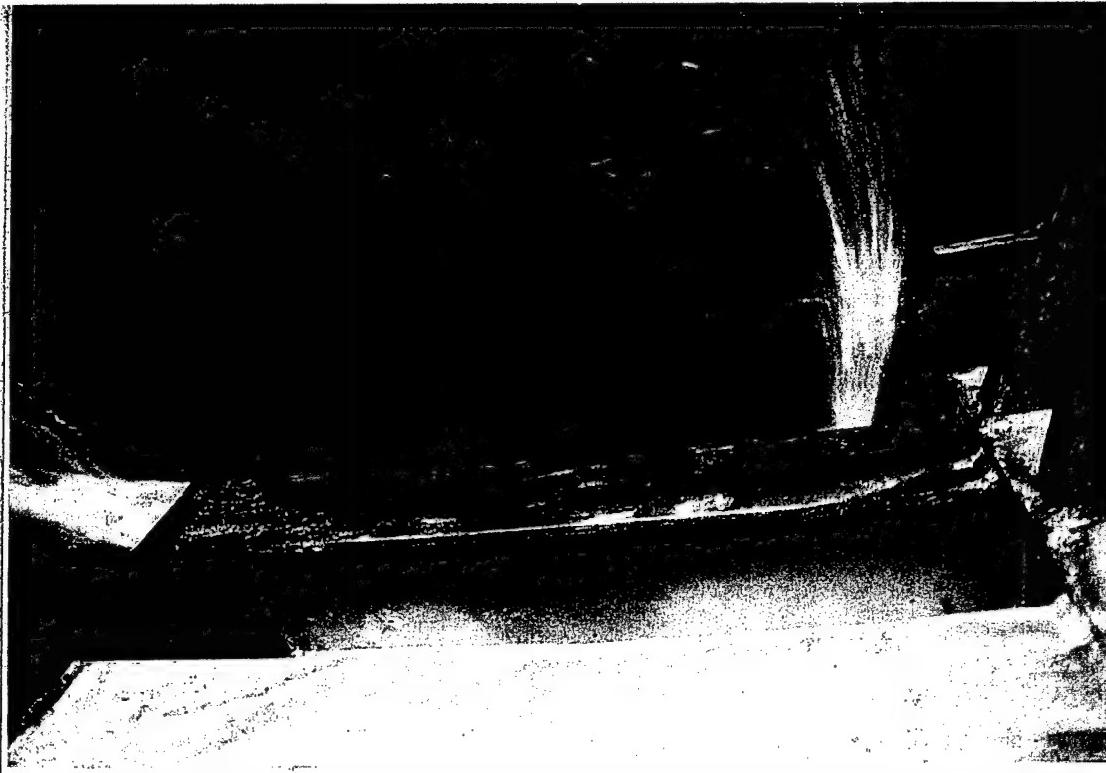
Gate 6
Bottom of bottom horizontal girder
at radial strut connection and girder
drain hole. Light corrosion on girder
web and stiffeners.



Little
Goose
Dam
10/11/00

6-20

Gate 6
Bottom seal closure plate, standing
water between closure plate, purlin
webs and skinplate, typical.



Little
Goose
Dam
10/11/00

6-21

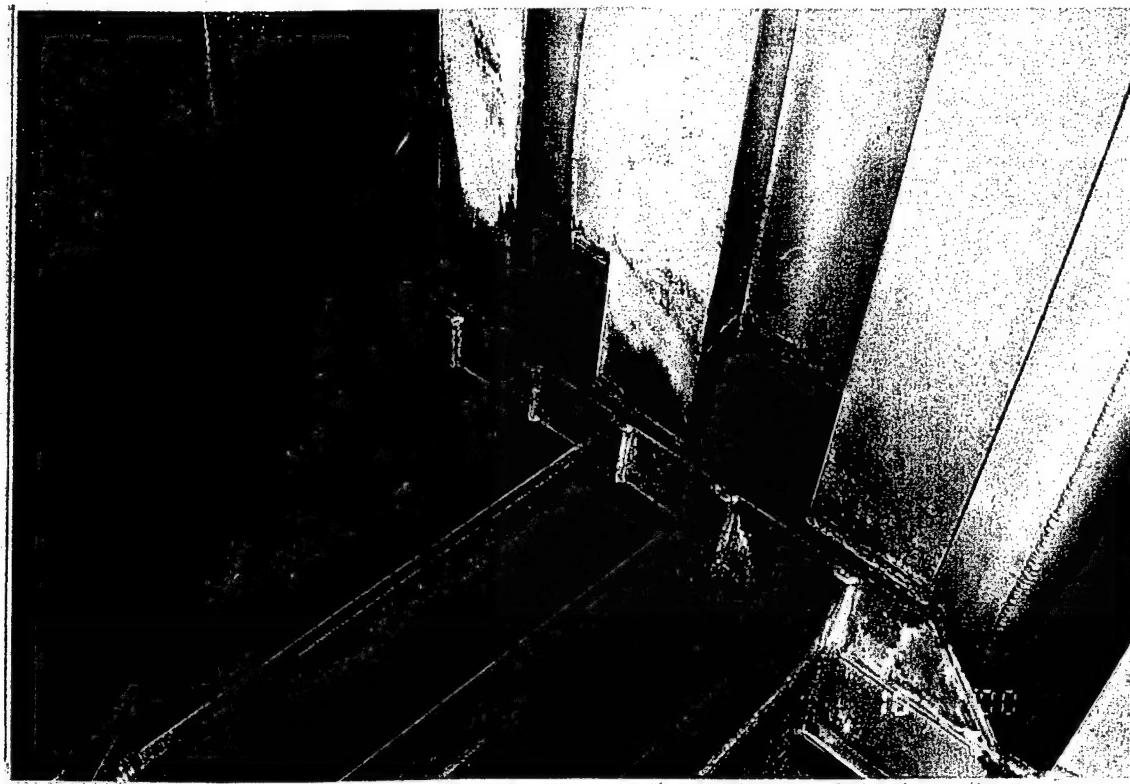
Gate 6
Side seal leak, bottom left side of
gate. Light corrosion on purlin,
horizontal girder and girder
stiffeners.



Little
Goose
Dam
10/11/00

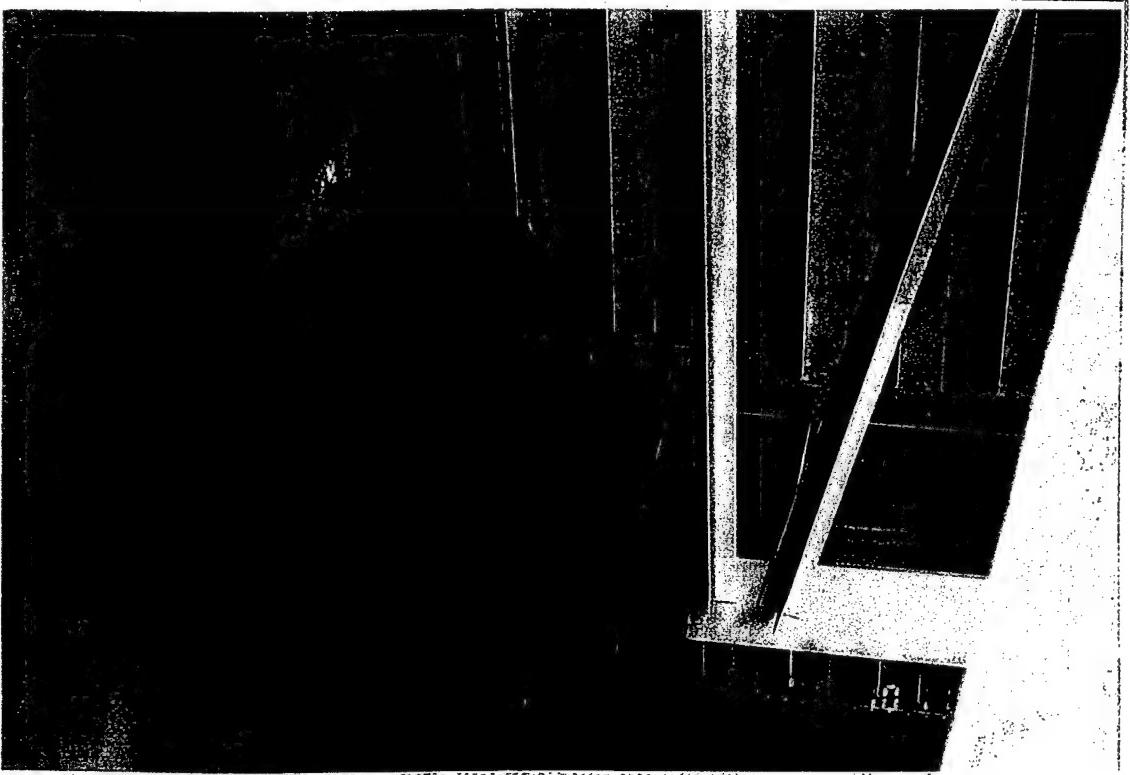
6-22

Gate 6
Side seal leak, bottom right side of
gate. Light corrosion on purlin,
horizontal girder and girder
stiffeners.



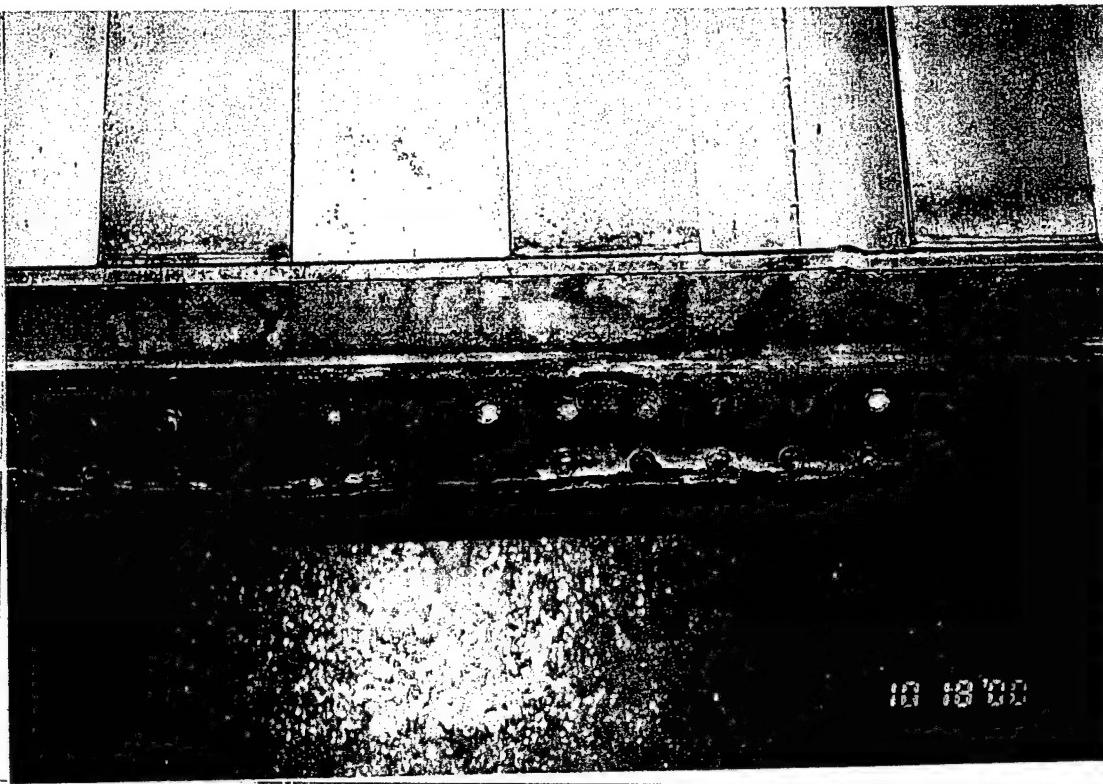
Little
Goose
Dam
10/11/00
6-23

Gate 6
Bottom horizontal girder. Standing
water, no drainage between multiple
stiffeners, typical. Horizontal girder
to skin plate stiffeners, standing
water, debris and no drainage.



Little
Goose
Dam
10/11/00
6-24

Gate 6
Bottom horizontal girder. Standing
water, no drainage between multiple
stiffeners, typical. Horizontal girder
to skin plate stiffeners, standing
water, debris and no drainage.



Little
Goose
Dam

10/18/00

6-25

Gate 6
Bottom seal keeper plate, typical.

10 18 '00

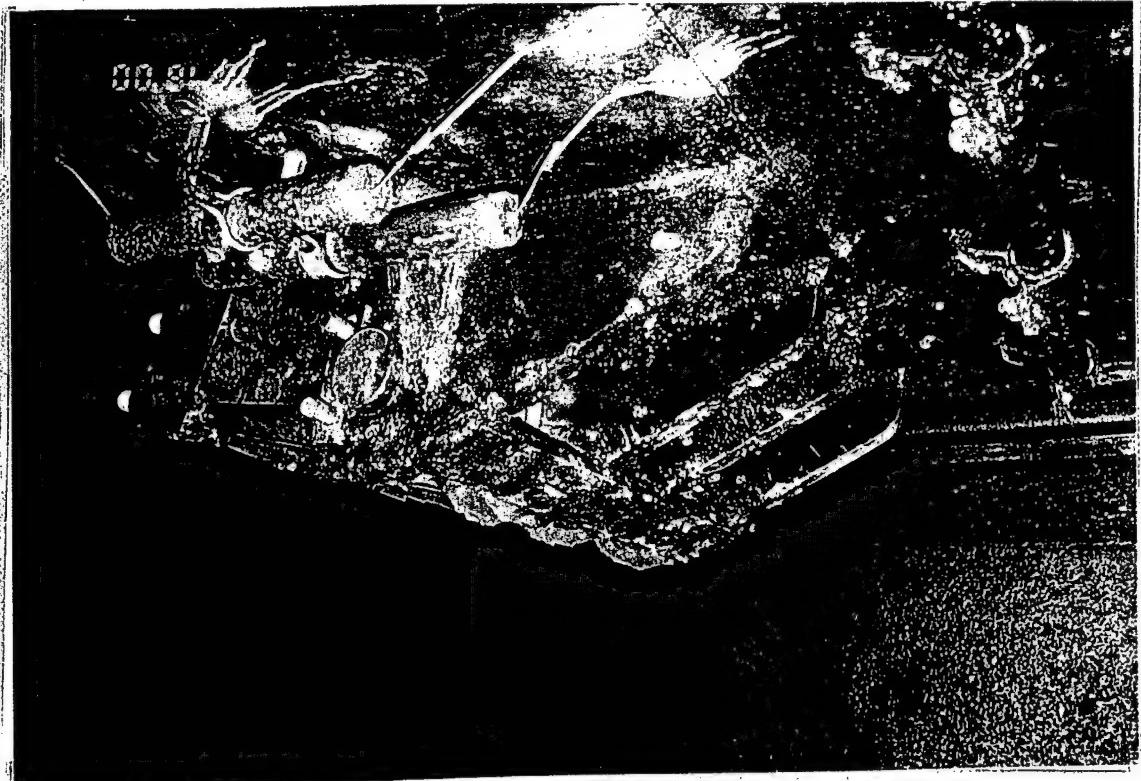


Little
Goose
Dam

10/18/00

6-26

Gate 6
Bottom seal keeper plate, typical.



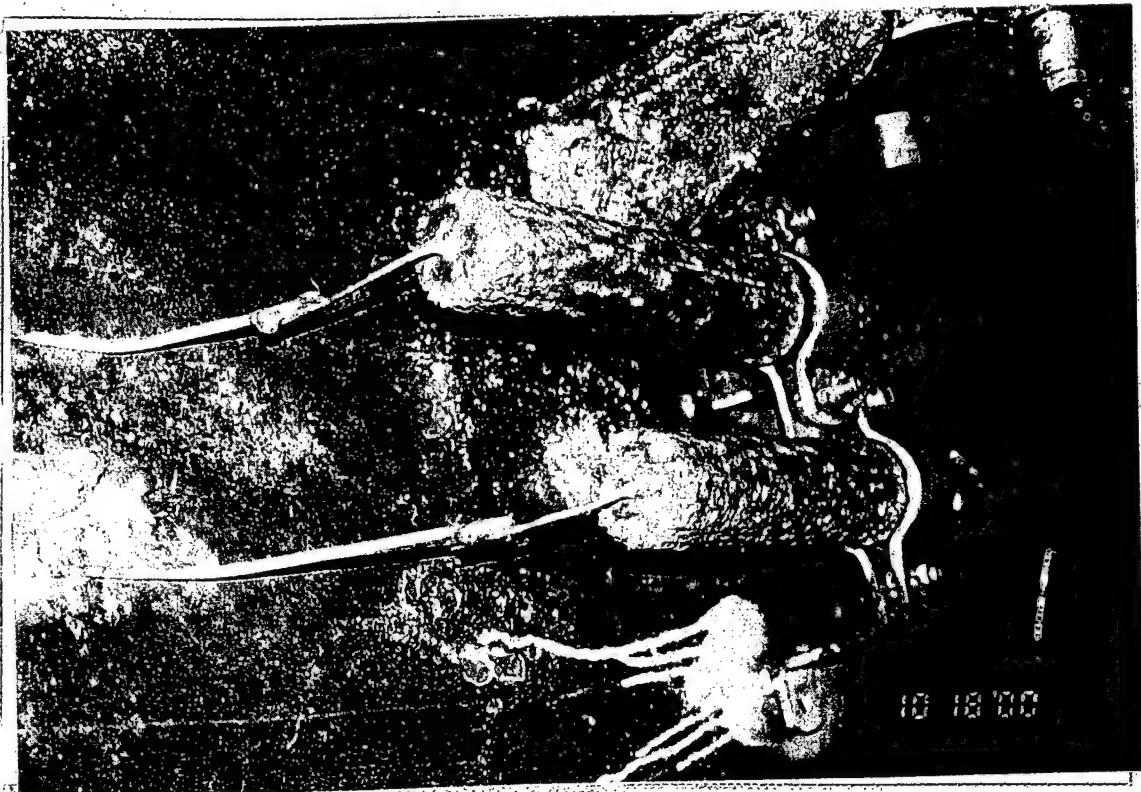
Little
Goose
Dam

10/18/00

6-27

Gate 6

Left hoist connection and anodes.
Light to moderate corrosion on
lifting lugs and plates. Note: Extra
anode under hoist connection not
found on other gates.

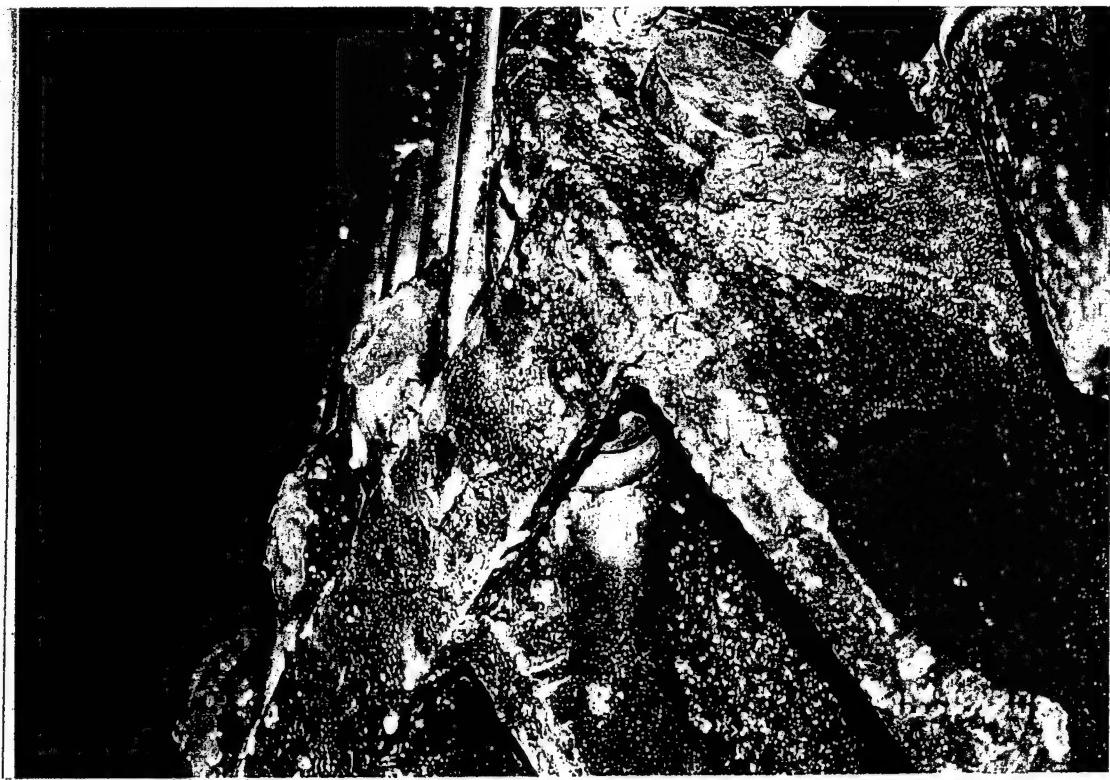


Little
Goose
Dam

10/18/00

6-28

Gate 6
Hoist connection anodes, typical.

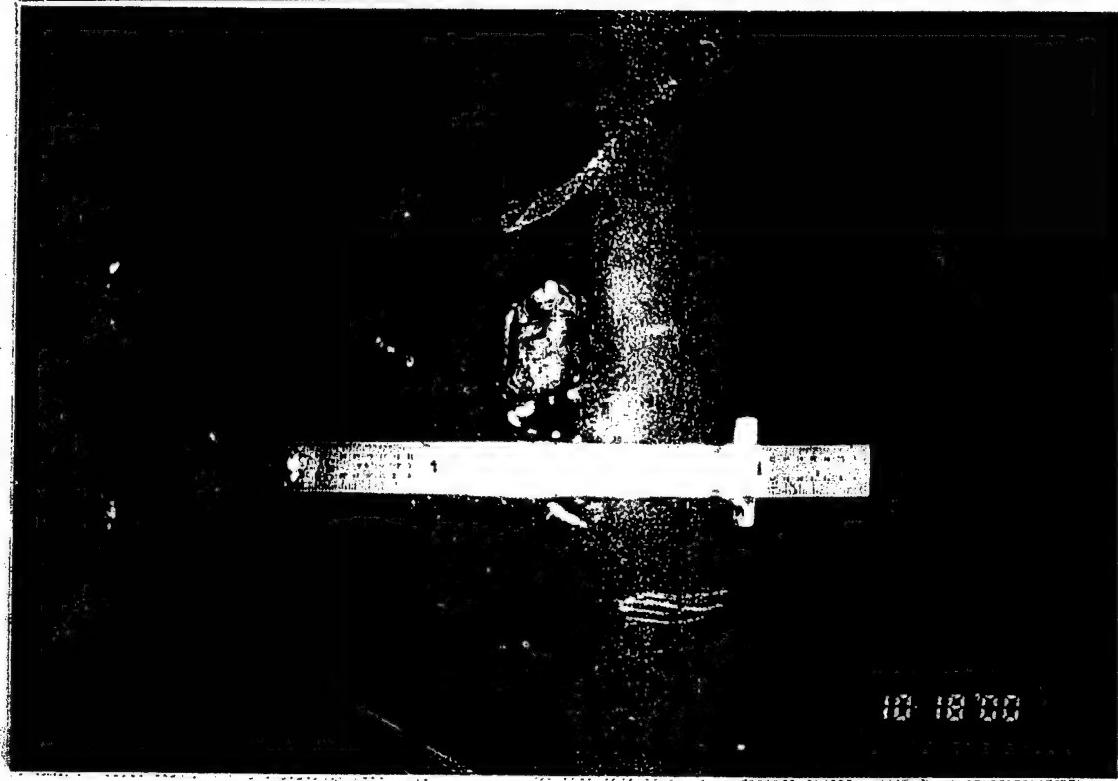


Little
Goose
Dam

10/18/00

6-29

Gate 6
Close-up hoist connection. Light to
moderate corrosion on lifting lugs
and plates.

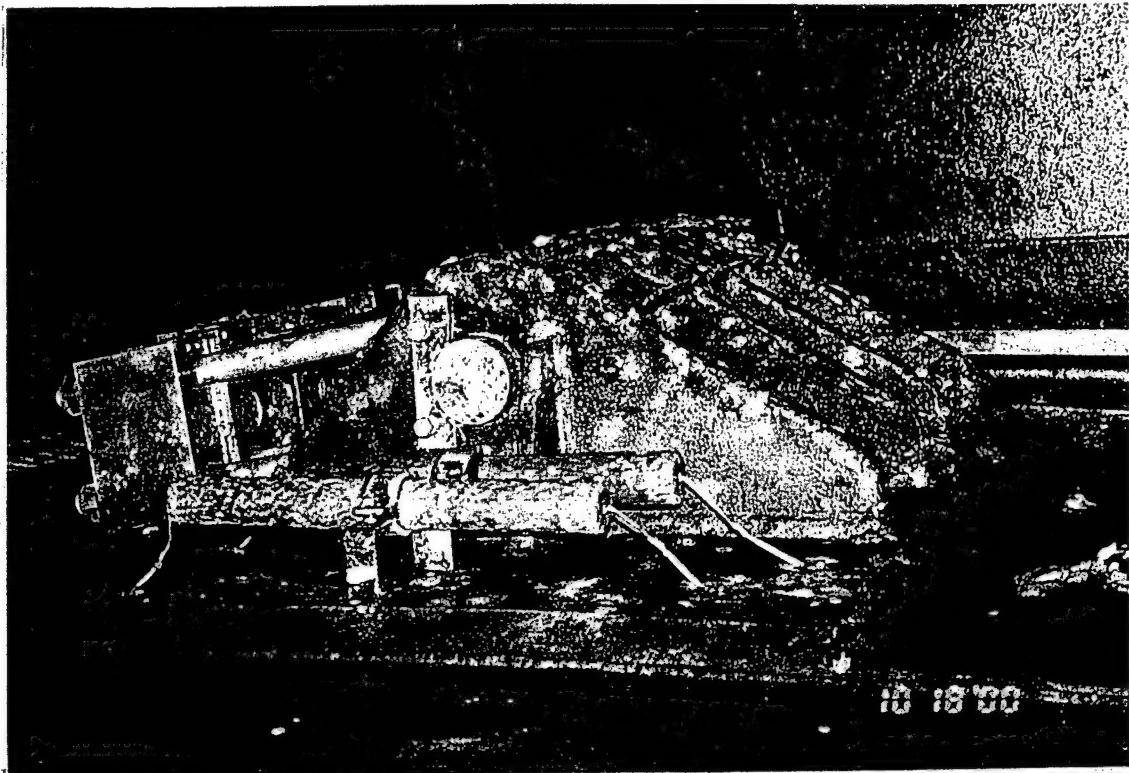


Little
Goose
Dam

10/18/00

6-30

Gate 6
Close-up, embedded bottom seal in
spillway.



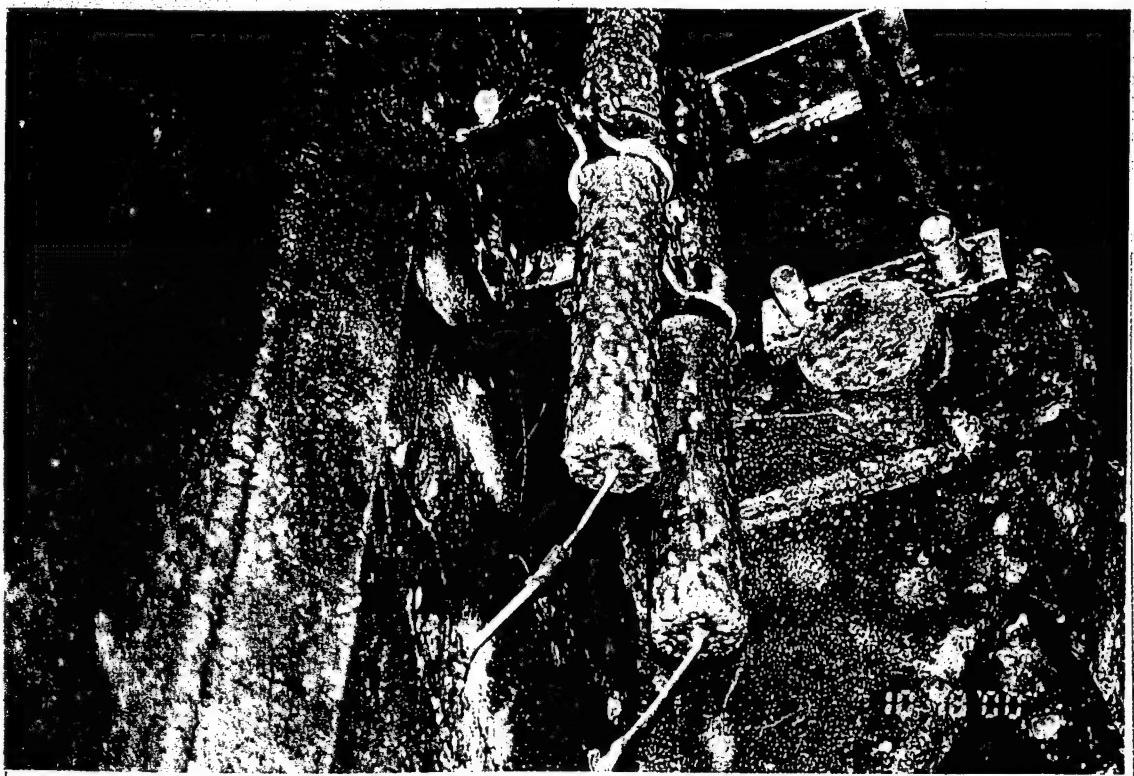
Little
Goose
Dam

10/18/00

6-31

Gate 6

Right hoist connection. Light to
moderate corrosion on lifting lugs and
plates.



Little
Goose
Dam

10/18/00

6-32

Gate 6

Right hoist connection. Light to
moderate corrosion on lifting lugs and
plates. Note: Generally good
condition of anodes.

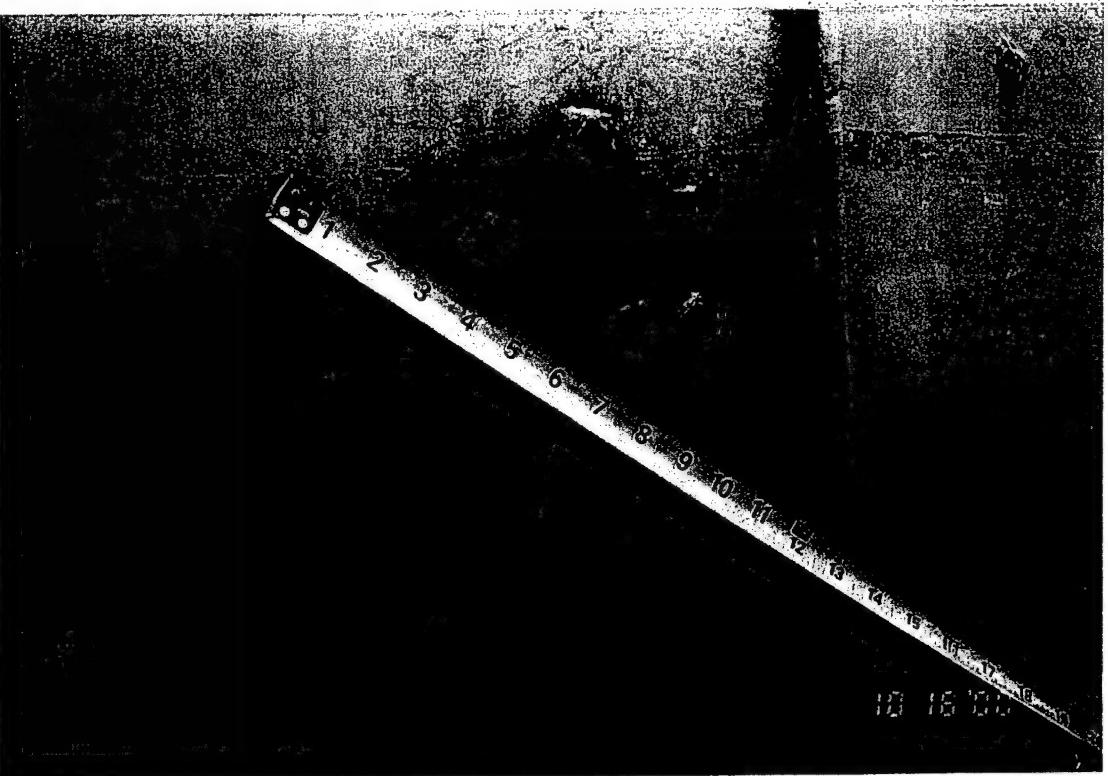


Little
Goose
Dam

10/18/00

6-33

Gate 6
Apparent previous anode bracket.



Little
Goose
Dam

10/18/00

6-34

Gate 6
.Skin plate pitting, typical.



Little
Goose
Dam

10/18/00

6-35

Gate 6
Skin plate condition, typical.
Minimal skin plate pitting.

10-18-00



Little
Goose
Dam

10/18/00

6-36

Gate 6
Skin plate condition, typical.
Minimal skin plate pitting.

10-18-00



Little
Goose
Dam

10/18/00

6-37

Gate 6
Left wear plate. Delaminated vinyl
coating.

10 18'00



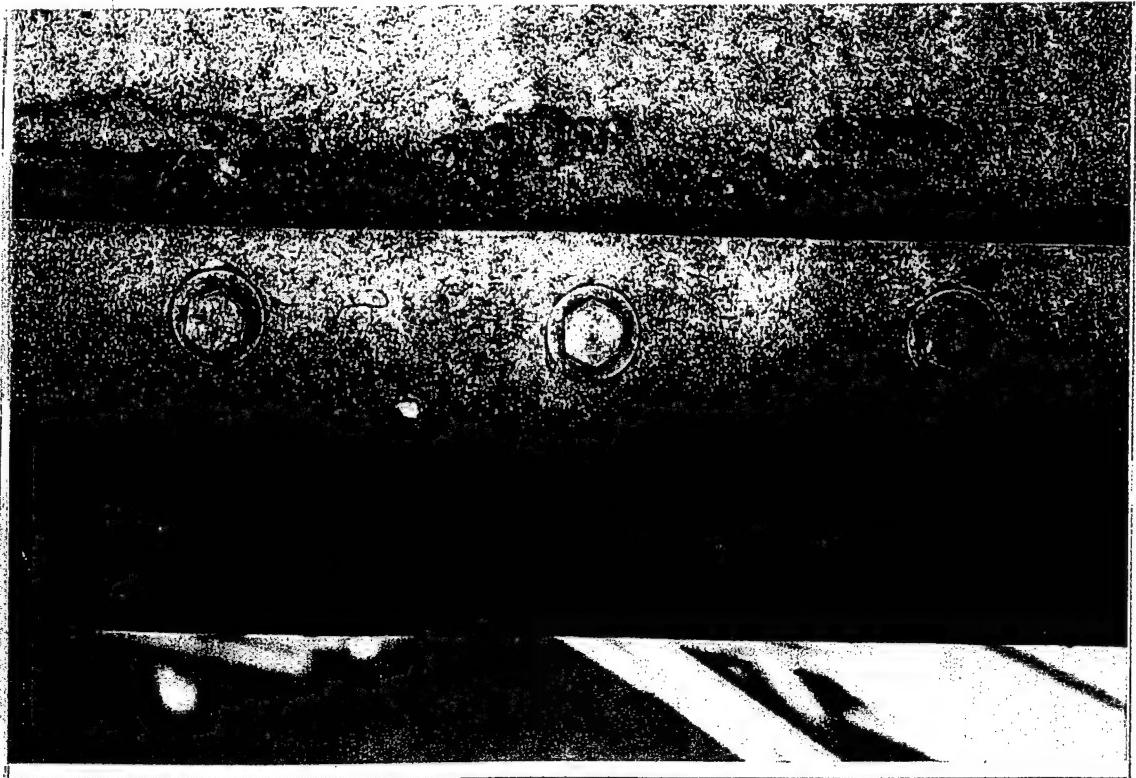
Little
Goose
Dam

10/18/00

6-38

Gate 6
Left wear plate. Delaminated vinyl
coating.

10 18'00

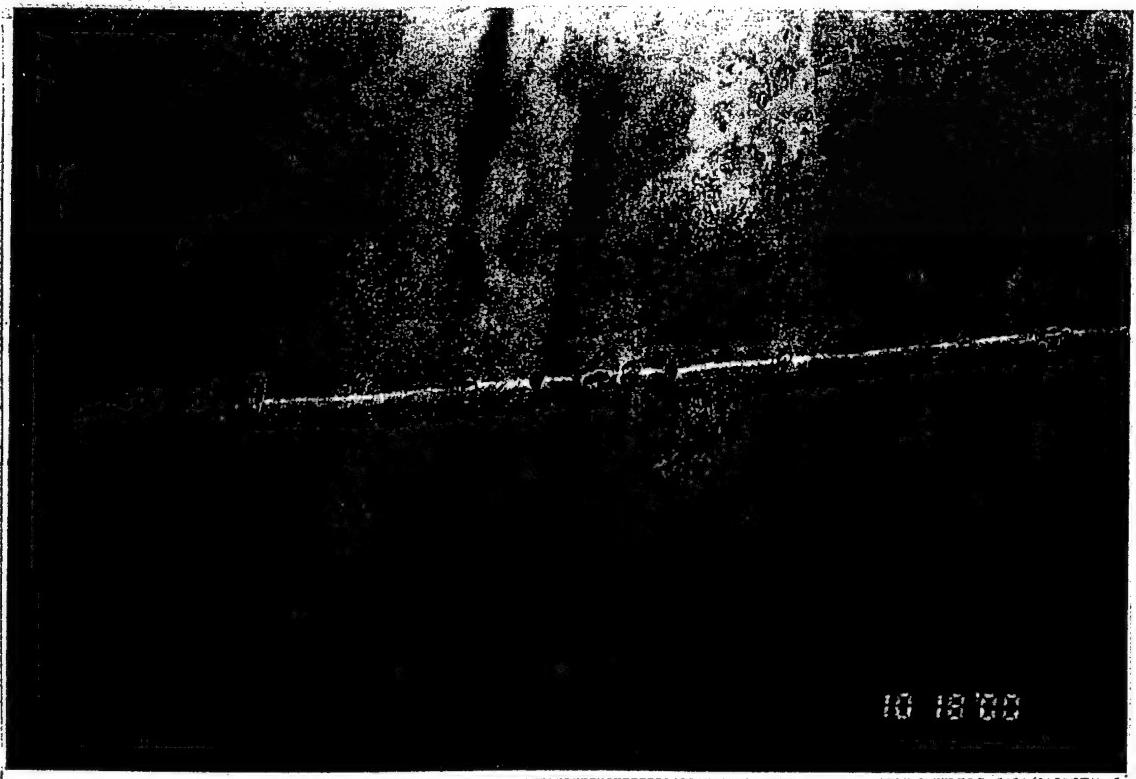


Little
Goose
Dam

10/18/00

6-39

Gate 6
Upstream side of side seal, typical.



Little
Goose
Dam

10/18/00

6-40

Gate 6
Light pitting along skin plate weld,
typical.



Little
Goose
Dam

10/11/00

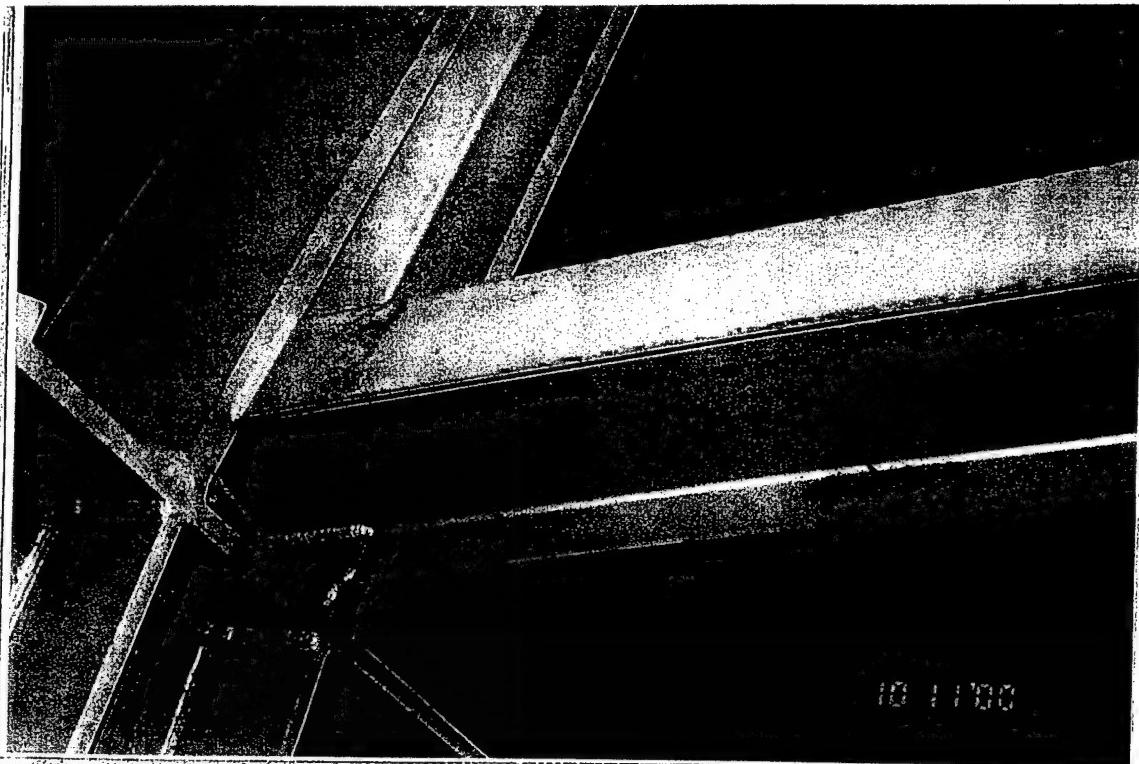
7-1



Little
Goose
Dam
10/11/00

Gate 7
Bottom horizontal girder, right end.
Standing water, no drainage between
multiple stiffeners, typical.

7-2



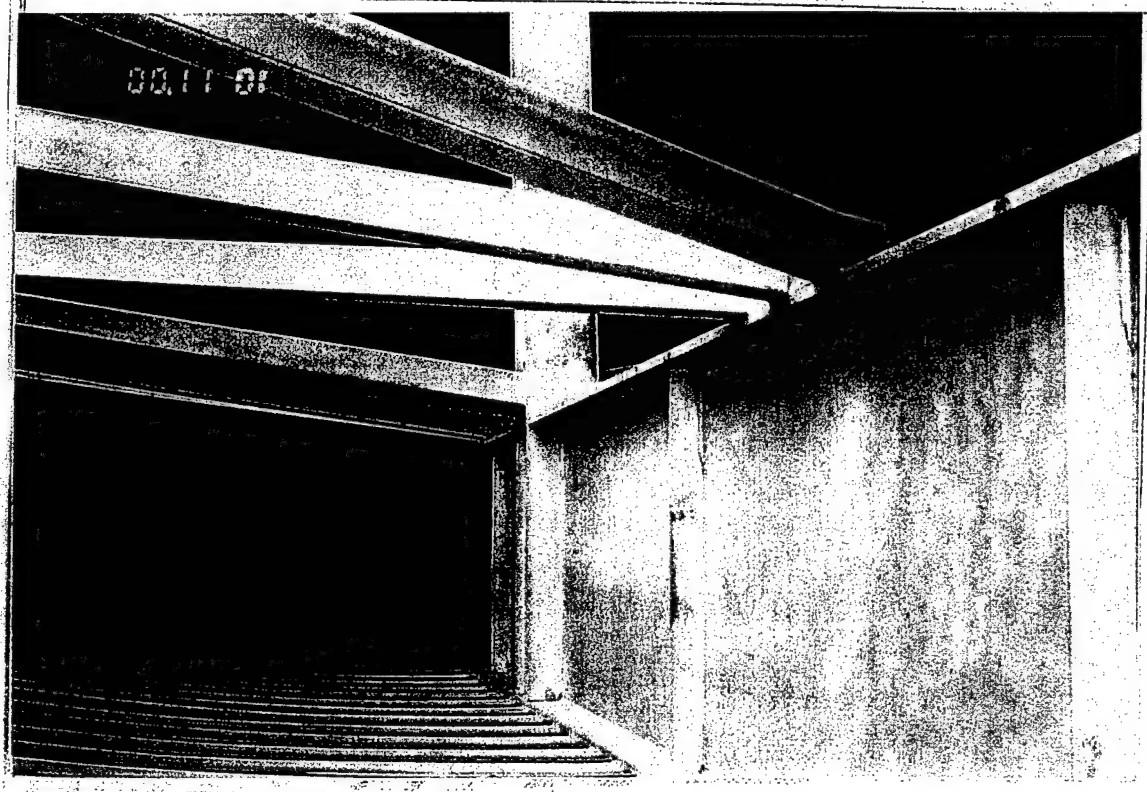
Little
Goose
Dam

10/11/00

7-3

Gate 7

Left frame, Brace A. Light corrosion
on brace, radial strut and horizontal
girder.



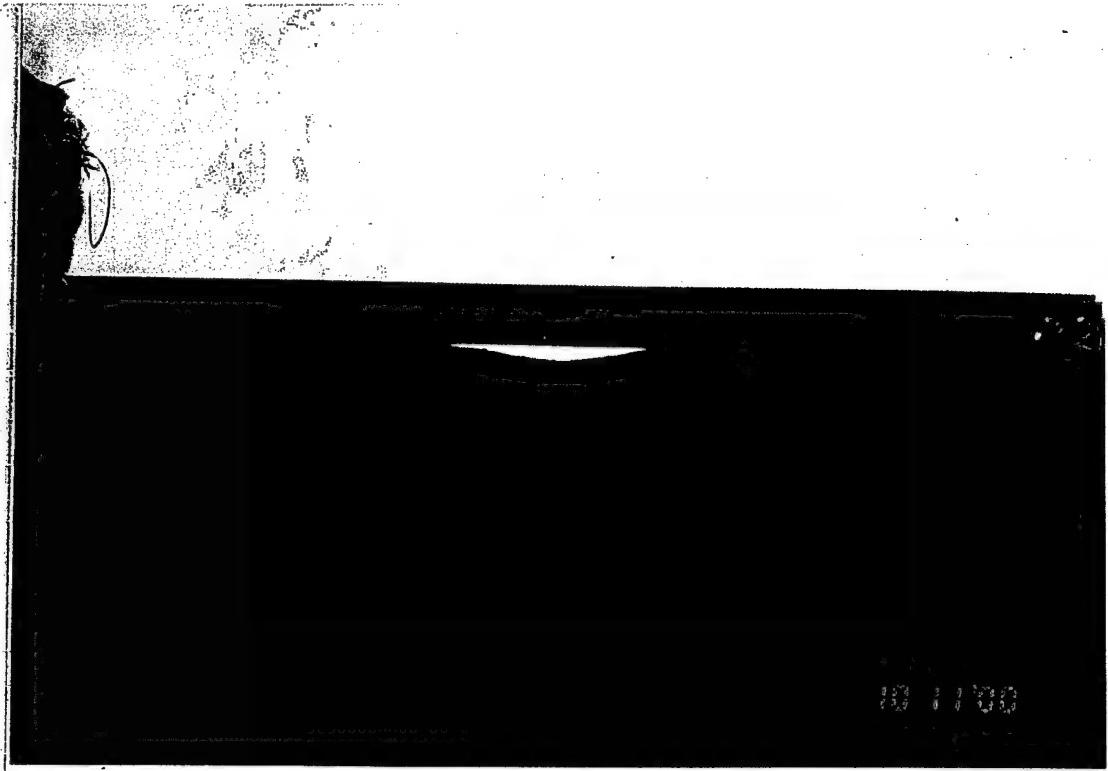
Little
Goose
Dam

10/11/00

7-4

Gate 7

Middle horizontal girder, typical.

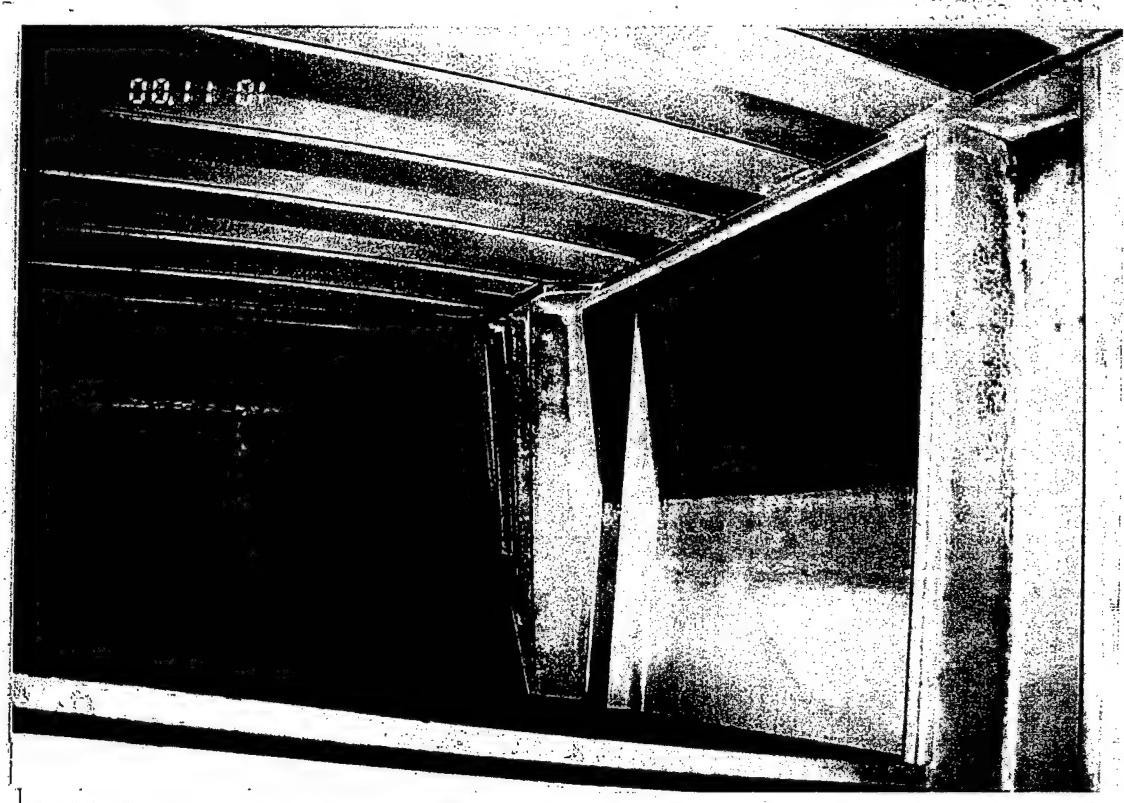


Little
Goose
Dam

10/11/00

7-5

Gate 7
Right frame, Brace L. Small
deformation in brace flange.



Little
Goose
Dam
10/11/00

7-6

Gate 7
Bottom horizontal girder, right end.
Standing water on girder web due to
inadequate drainage and side seal
leak.

10/11/00

Little
Goose
Dam

10/11/00

7-7

Gate 7
Skin plate purlins, typical.

Little
Goose
Dam

10/11/00

7-8

Gate 7
Bottom right corner of gate, side seal
leak.

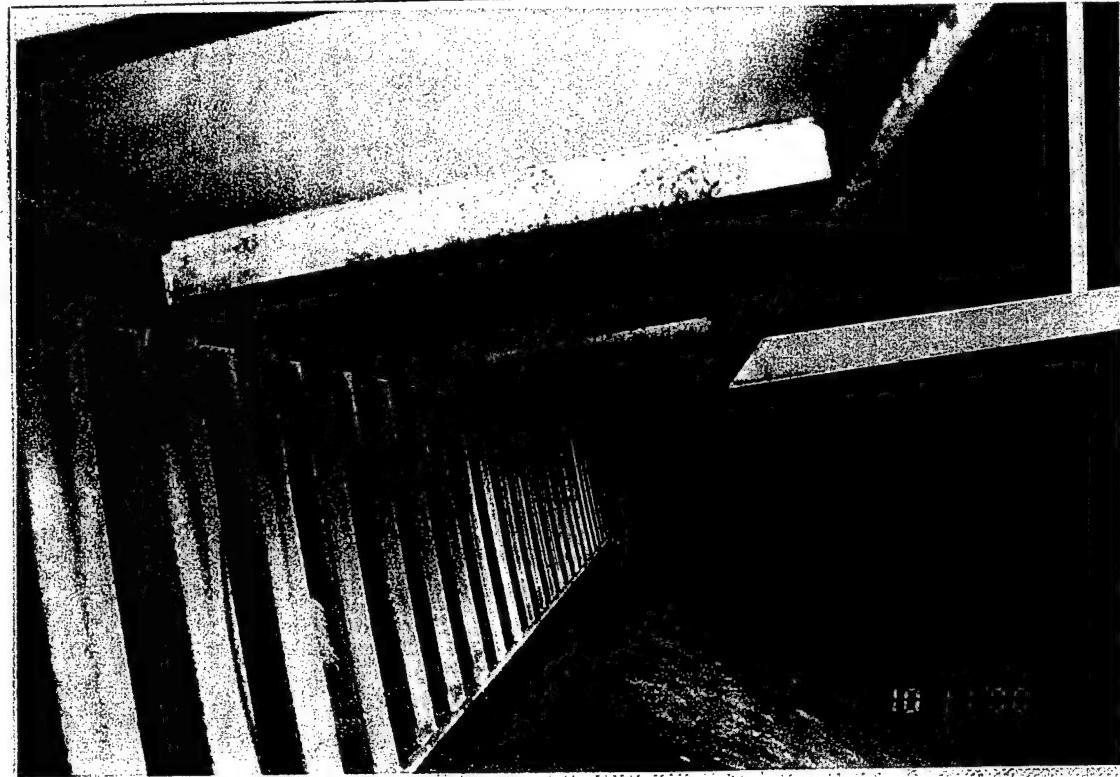




Little
Goose
Dam
10/11/00

7-9

Gate 7
Bottom seal closure plate looking upstream. Standing water between closure plate, purlin webs and skinplate. Typical.



Little
Goose
Dam

10/11/00

7-10

Gate 7
Bottom of bottom horizontal girder, typical.



Little
Goose
Dam
10/11/00

7-11

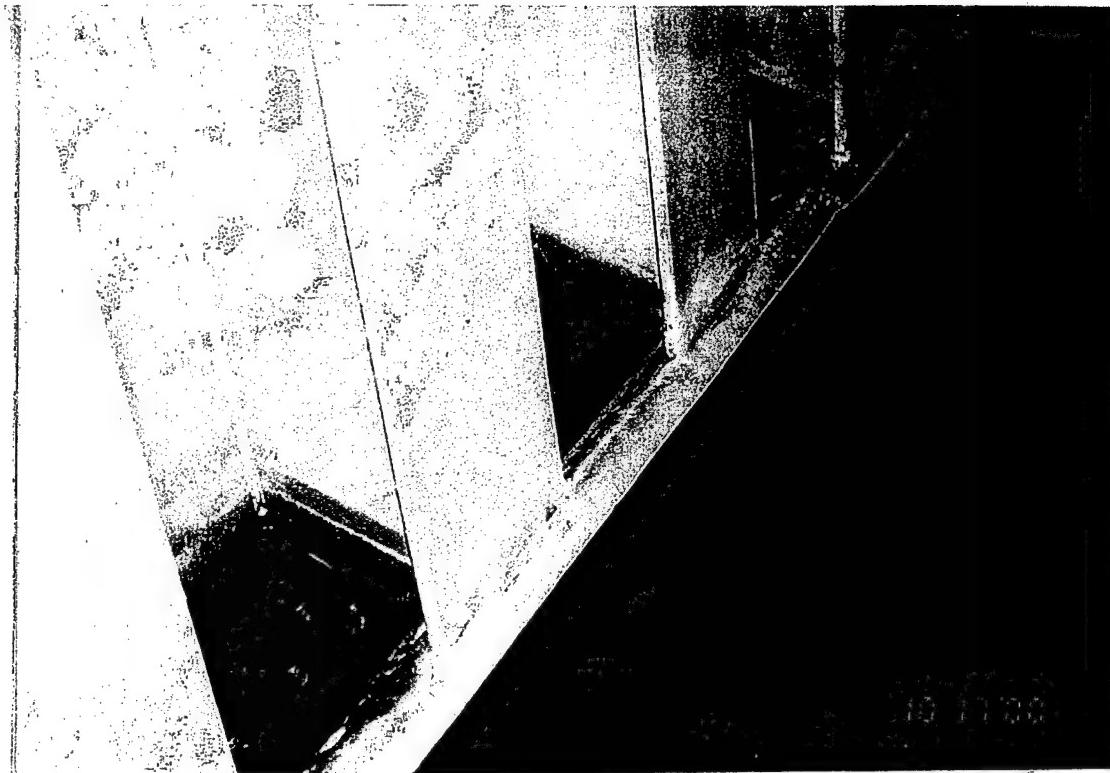
Gate 7
Bottom seal closure plate looking upstream. Standing water between closure plate, purlin webs and skinplate, typical.



Little
Goose
Dam
10/11/00

7-12

Gate 7
Bottom horizontal girder, left end.
Standing water, no drainage between multiple stiffeners, typical.



Little
Goose
Dam
10/17/00

7-13

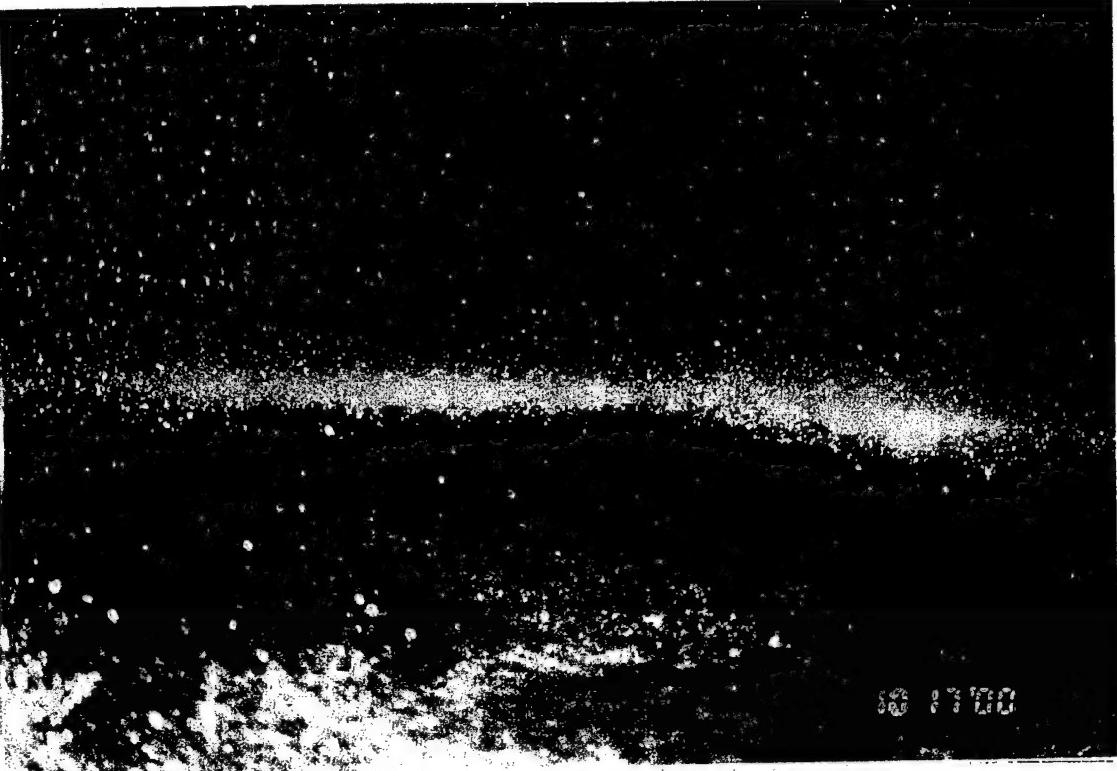
Gate 7
Bottom seal closure plate. Standing
water between closure plate, purlin
webs and skinplate, typical.



Little
Goose
Dam
10/17/00

7-14

Gate 7
Bottom seal closure plate. Standing
water between closure plate, purlin
webs and skinplate, typical.



10 17'00

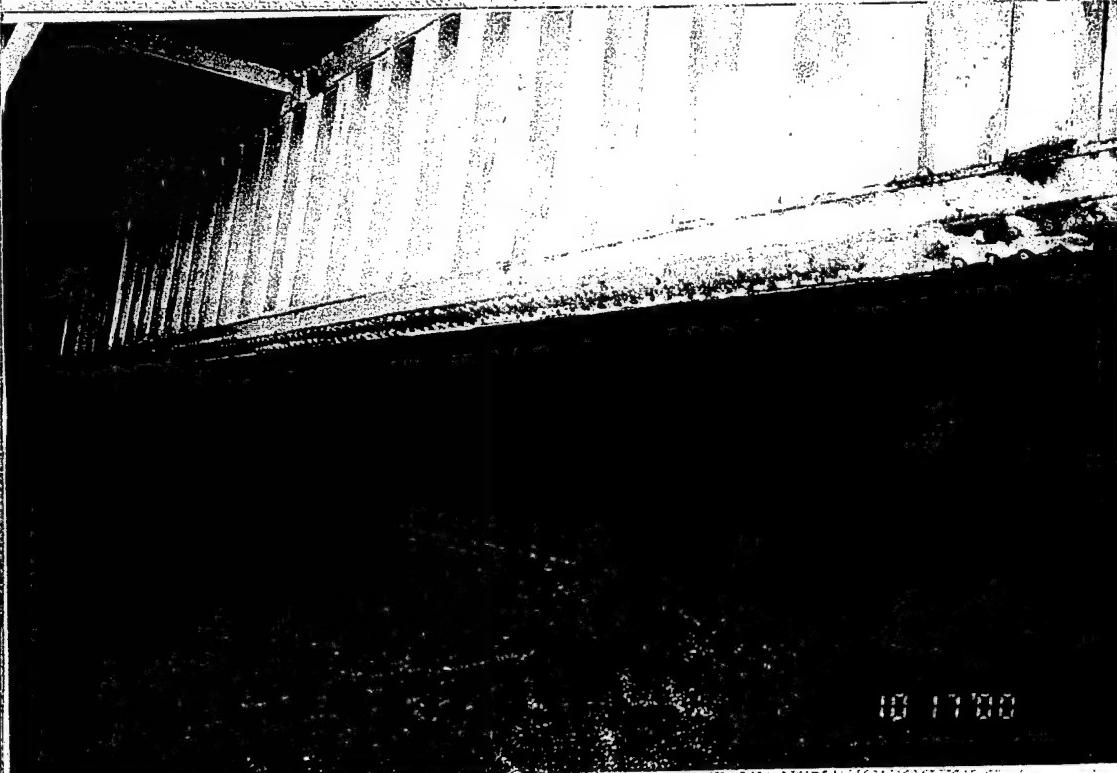
Little
Goose
Dam

10/17/00

7-15

Gate 7

Stop log leakage precluding
inspection of hoist connections from
bottom.



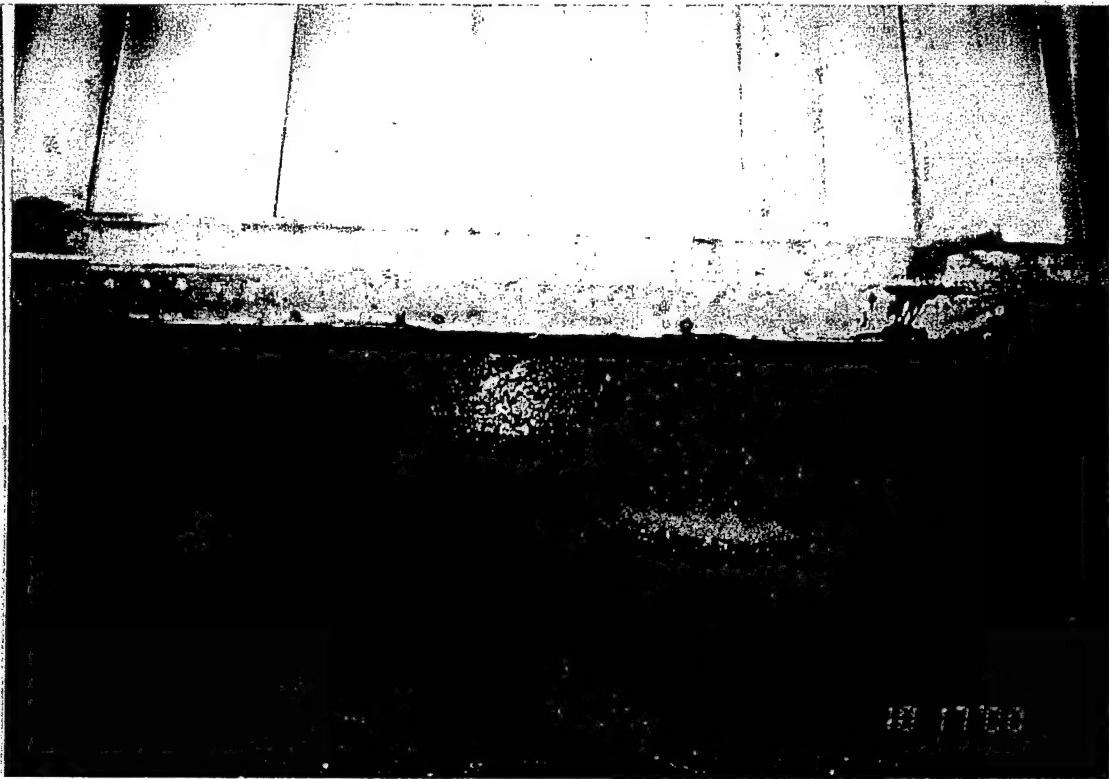
Little
Goose
Dam

10/17/00

Gate 7

Bottom of gate and bottom seal
keeper plate, typical. Stop log
leakage precluding inspection of
hoist connections from bottom.

7-16



Little
Goose
Dam

10/17/00

7-17

Gate 7
Bottom seal keeper plate, typical.
Stop log leakage precluding
inspection of hoist connections from
bottom.

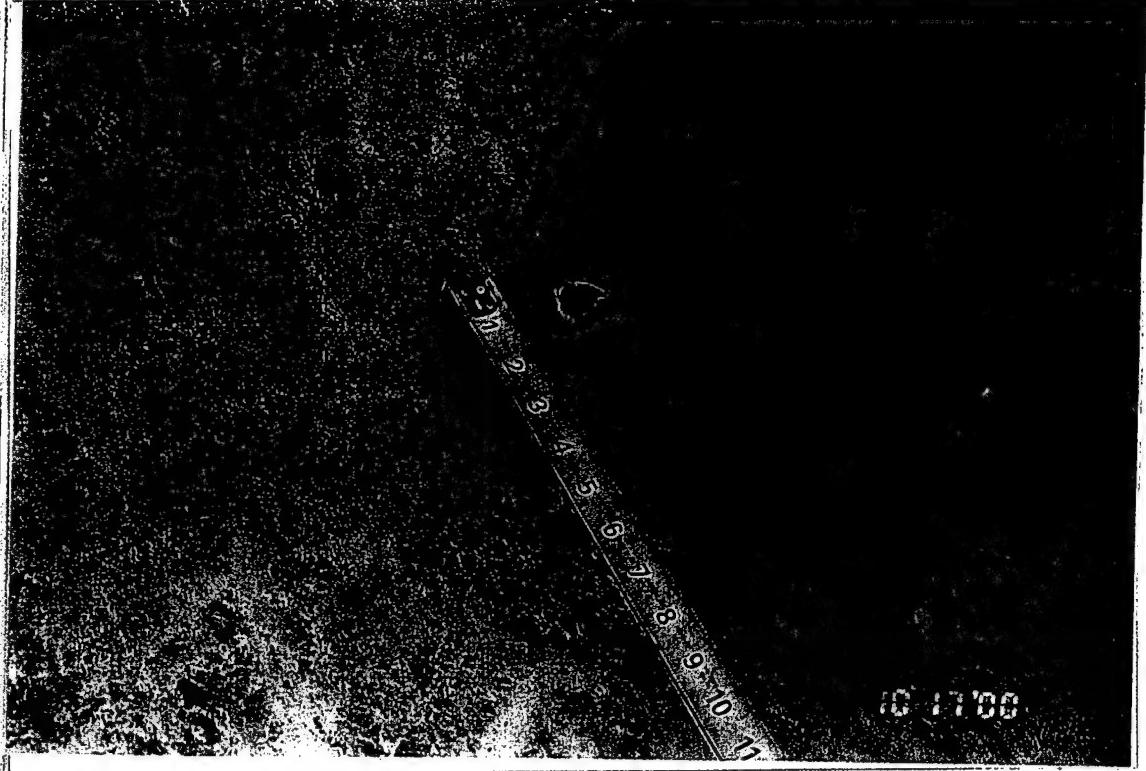


Little
Goose
Dam

10/17/00

7-18

Gate 7
Skin plate condition, typical.



10/17/00

Little
Goose
Dam
10/17/00
7-19

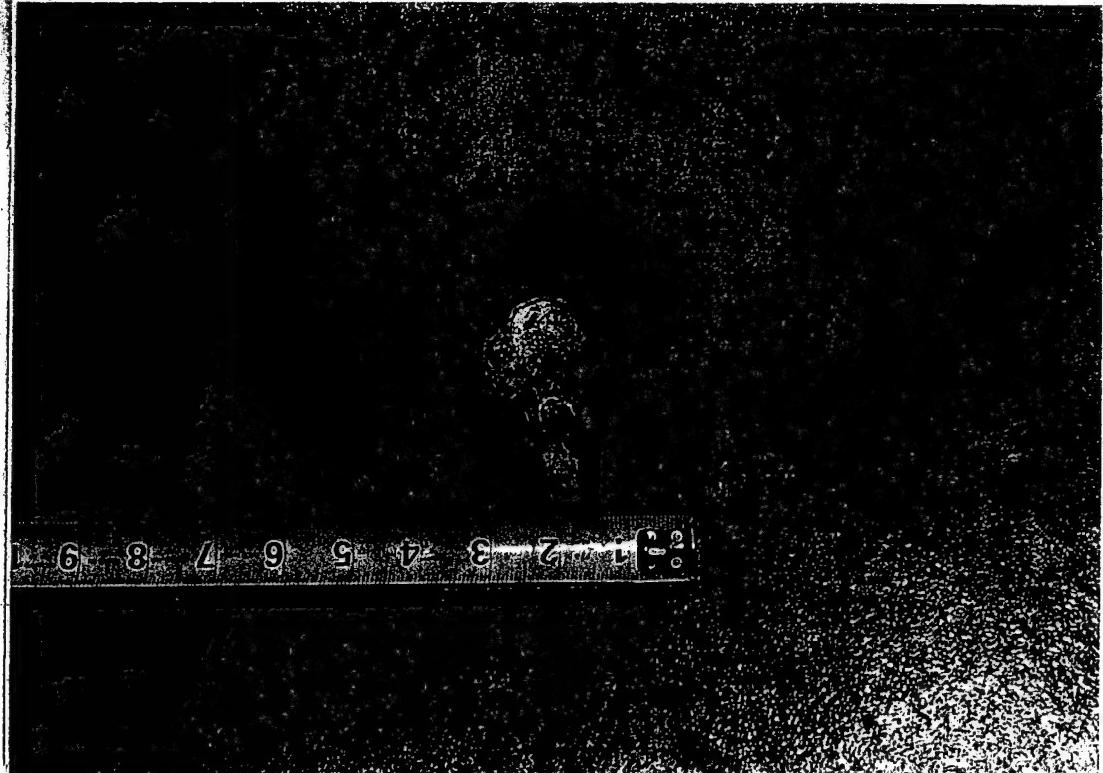
Gate 7
Skin plate pitting, typical.



10/17/00

Little
Goose
Dam
10/17/00
7-20

Gate 7
Skin plate pitting, typical.



Little
Goose
Dam

10/17/00

7-21

Gate 7
Skin plate pitting, typical.

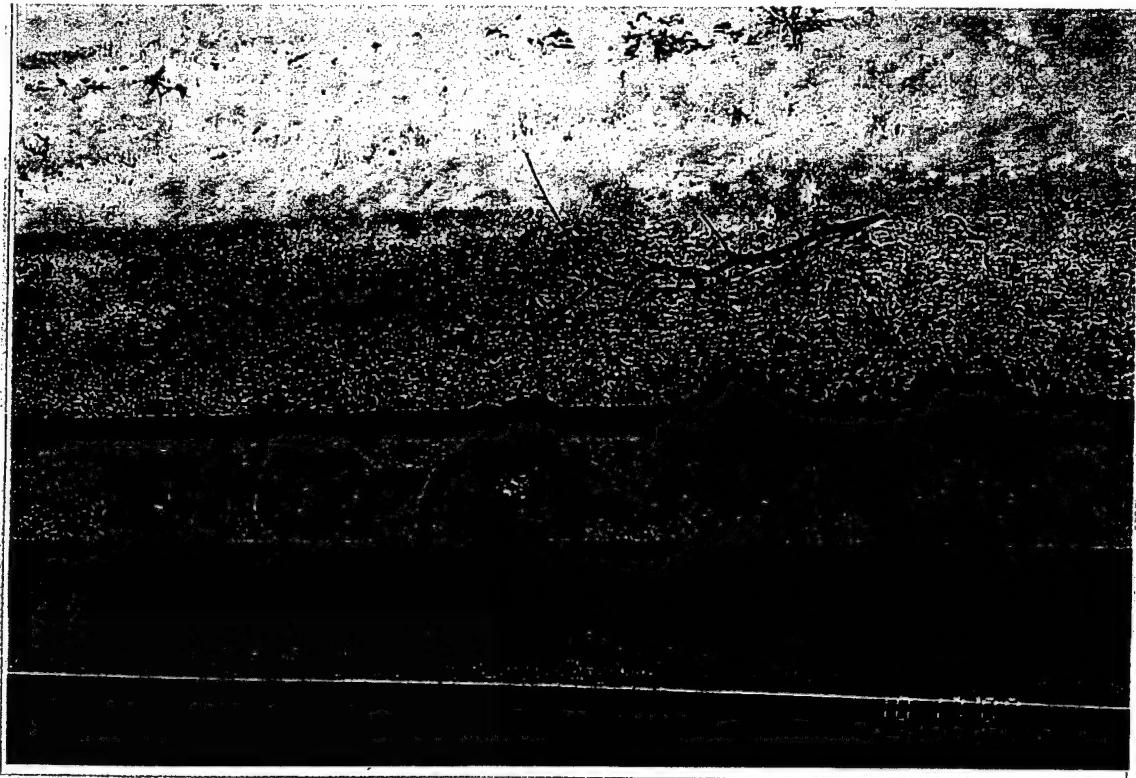


Little
Goose
Dam

10/17/00

7-22

Gate 7
Skin plate pitting, typical.



Little
Goose
Dam

10/17/00

7-23

Gate 7
Upstream side of side seal, typical.



Little
Goose
Dam

10/17/00

7-24

Gate 7
Wear plate condition, typical.



Little
Goose
Dam

10/17/00

7-25

Gate 7
Waterblasting skin plate.



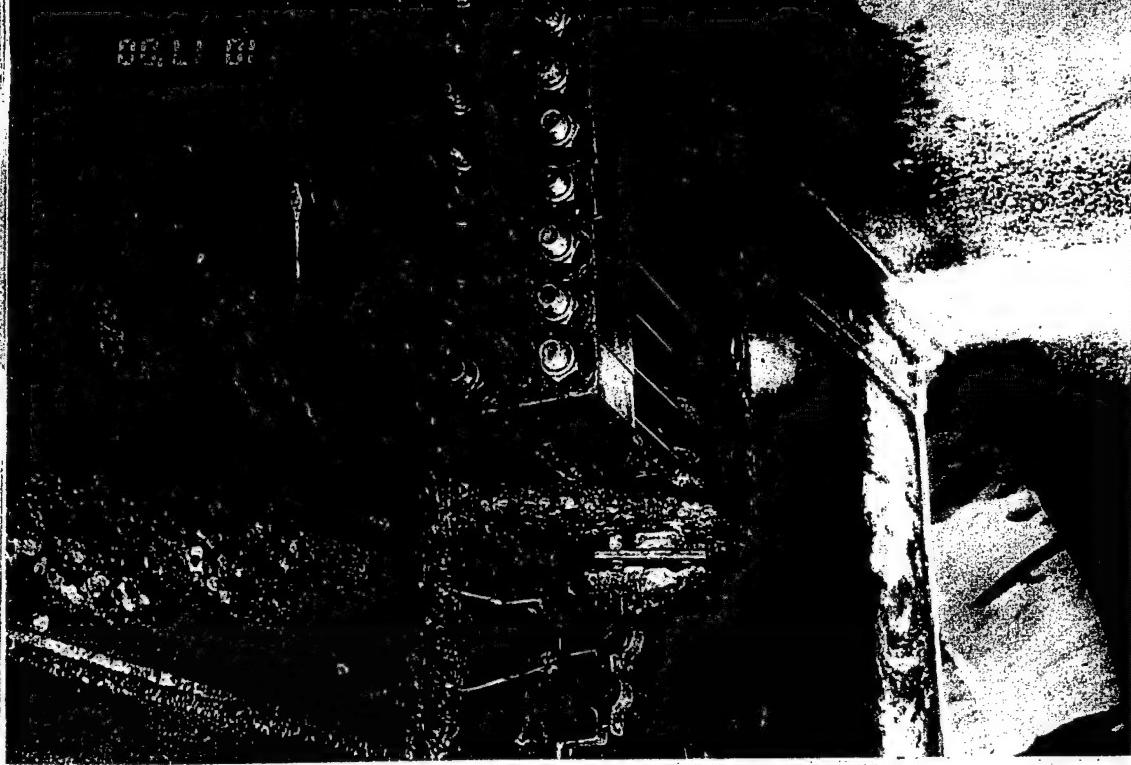
Little
Goose
Dam

10/17/00

7-26

Gate 7
Hoist connection, from above.

BRILL DR.



Little
Goose
Dam
10/17/00

Gate 7

Hoist connection from above. Light
to moderate corrosion on lifting lugs
and plates. Stainless steel U-bolts
and socket blocks in good condition.

7-27



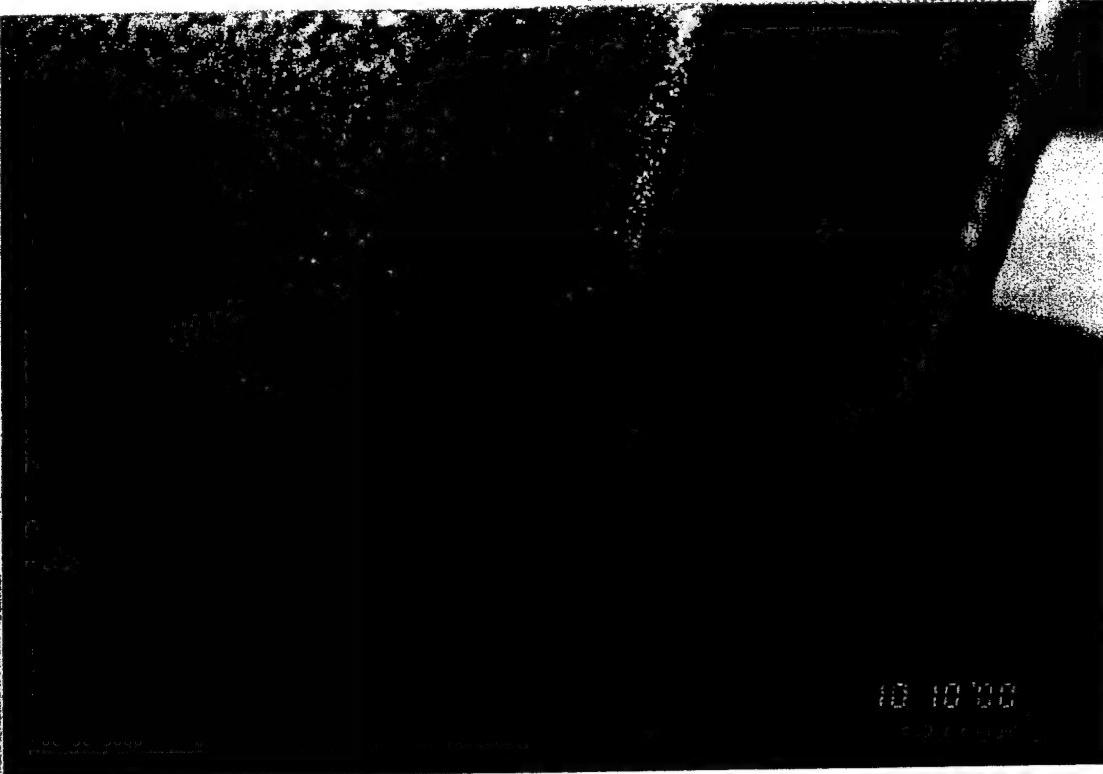
10 10 '00

Little
Goose
Dam

Gate 8
Left frame Brace C. Light corrosion
on brace, typical.

10/10/00

8-1



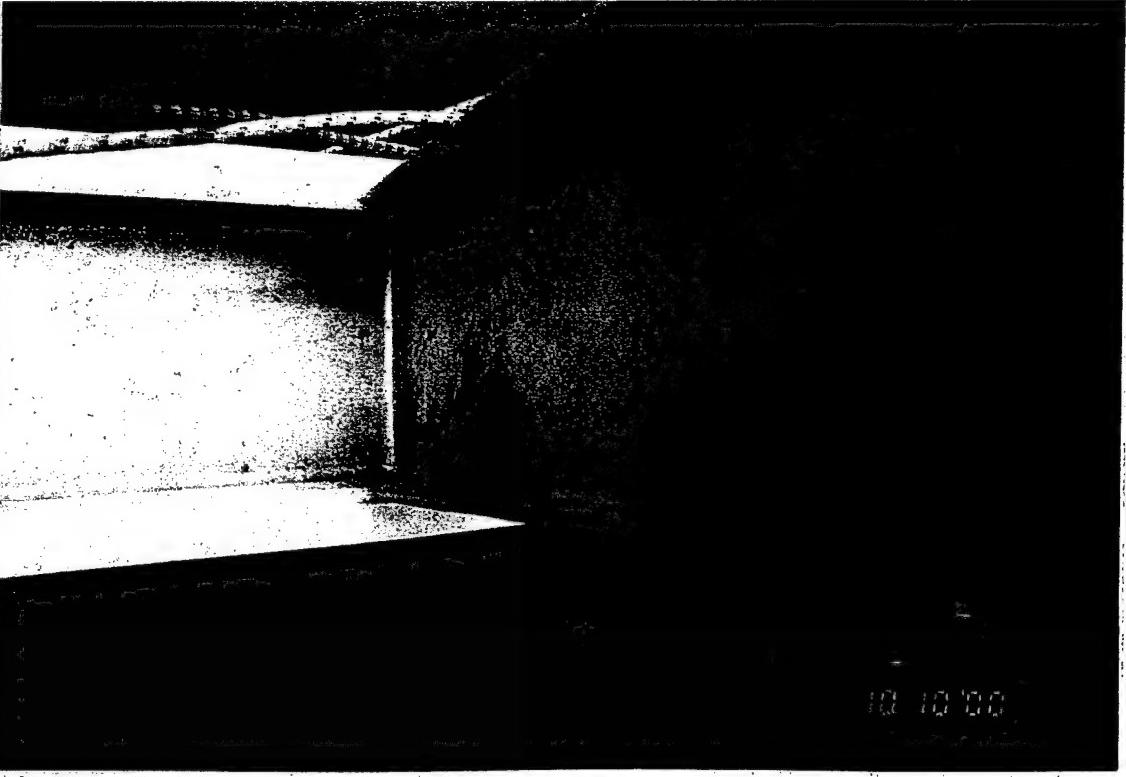
10 10 '00

Little
Goose
Dam

Gate 8
Close-up, left frame Brace D. Light
corrosion on brace, typical.

10/10/00

8-2



10 10 '00

Little
Goose
Dam

10/10/00

8-3

Gate 8

Left frame Brace G. Light corrosion
on brace, typical.



Little
Goose
Dam

10/10/00

8-4

Gate 8

Outside of left frame, typical.

09.07.01

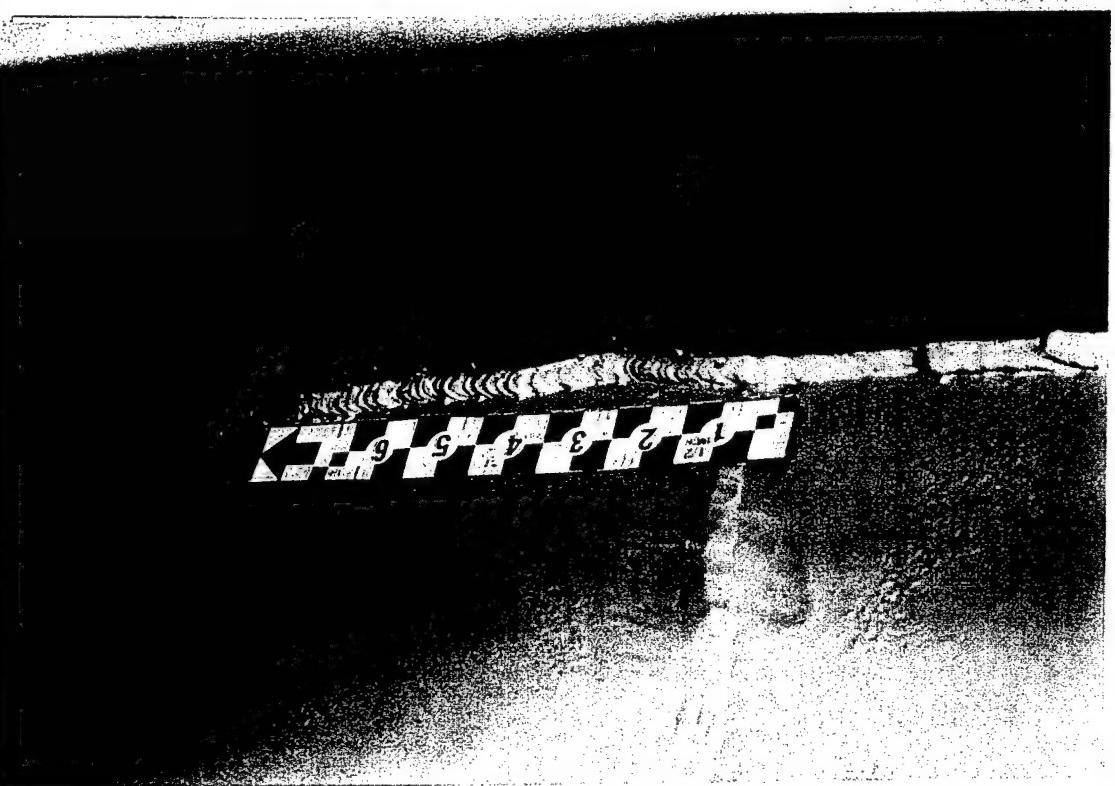


Little
Goose
Dam

10/10/00

8-5

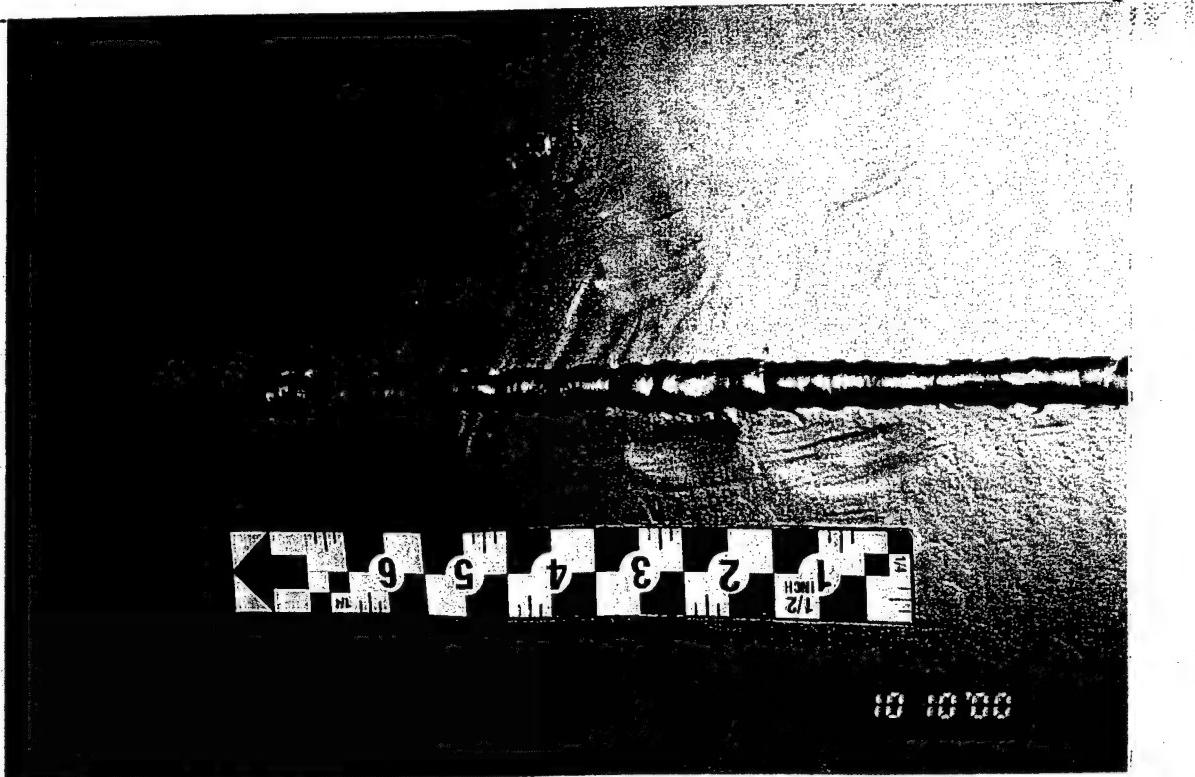
Gate 8
Left end, middle horizontal girder.
Light corrosion on girder, purlins.



Little
Goose
Dam
10/10/00

8-6

Gate 8
Downstream surface of skin plate, left
side of gate above middle horizontal
girder. Apparent grind marks from
weld repair.



Little
Goose
Dam
10/10/00

8-7

Gate 8
Downstream surface of skin plate, left
side of gate above middle horizontal
girder. Apparent grind marks from
weld repair.

10 10'00

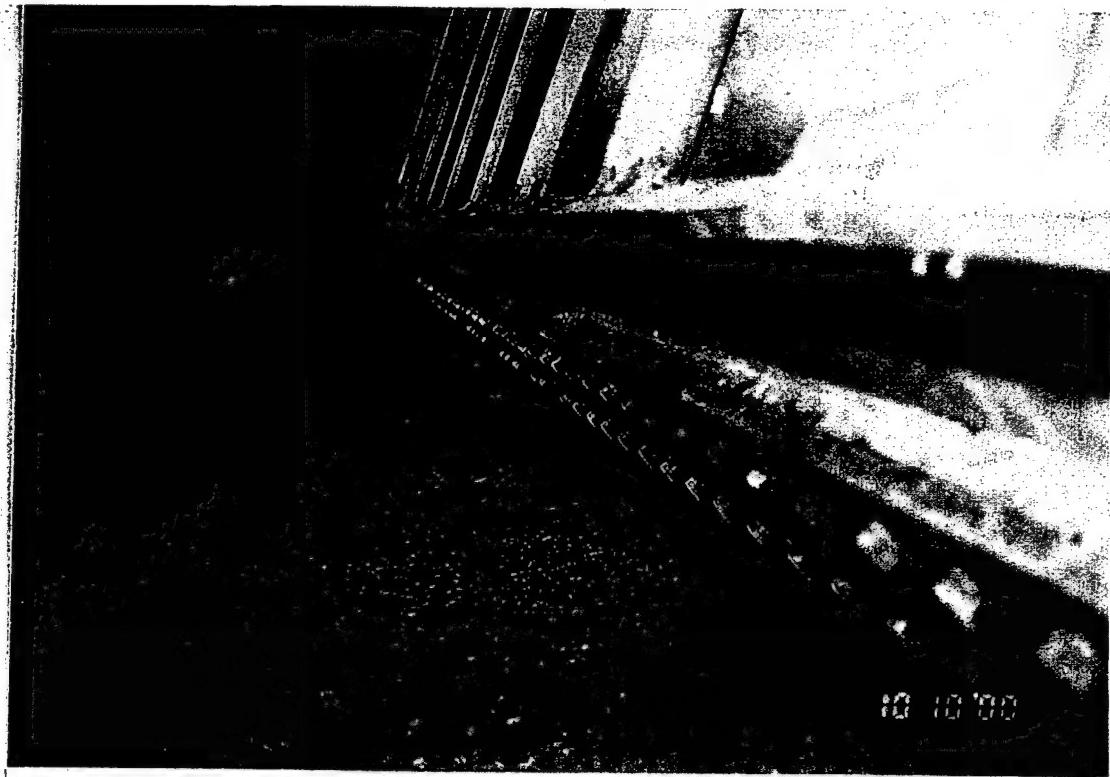


Little
Goose
Dam
10/10/00

8-8

Gate 8
Bottom horizontal girder. Standing
water, no drainage between multiple
stiffeners, typical. Girder flange to
skin plate stiffeners, standing water,
no drainage.

10 10'00

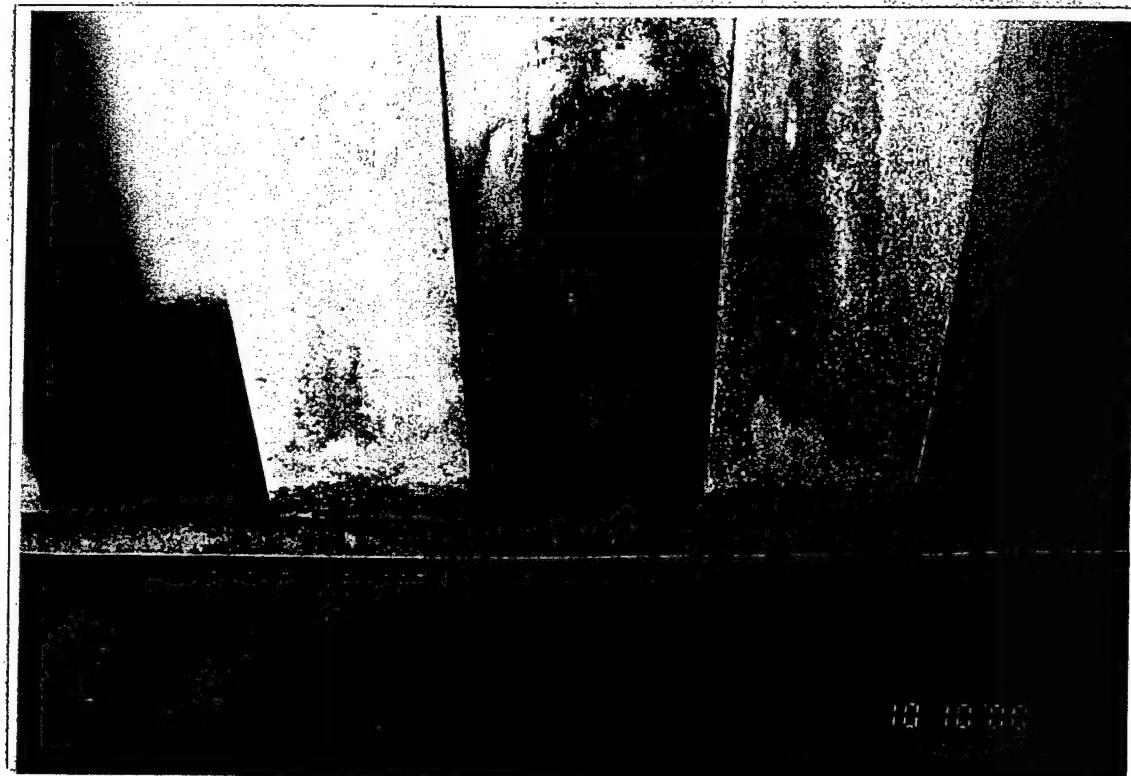


10 10 '00

Little
Goose
Dam
10/10/00
8-9

Gate 8

Bottom seal keeper plate, light
corrosion, typical. Leak at center
construction joint in spillway
monolith.

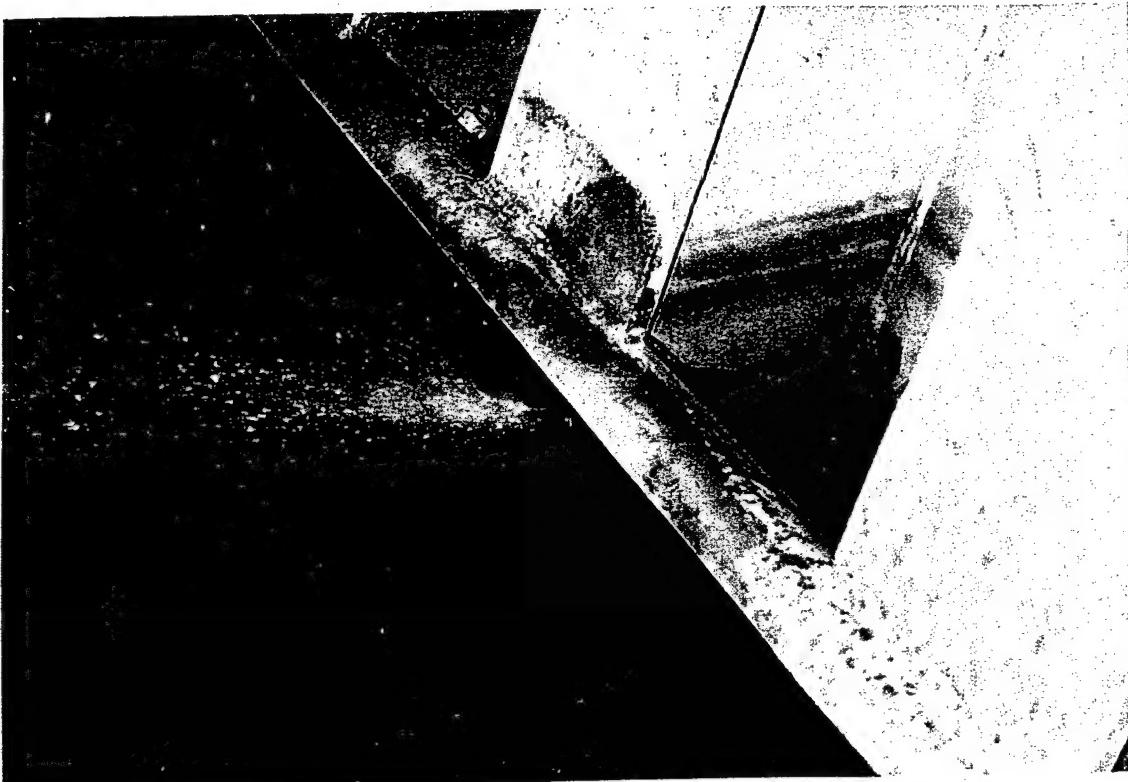


10 10 '00

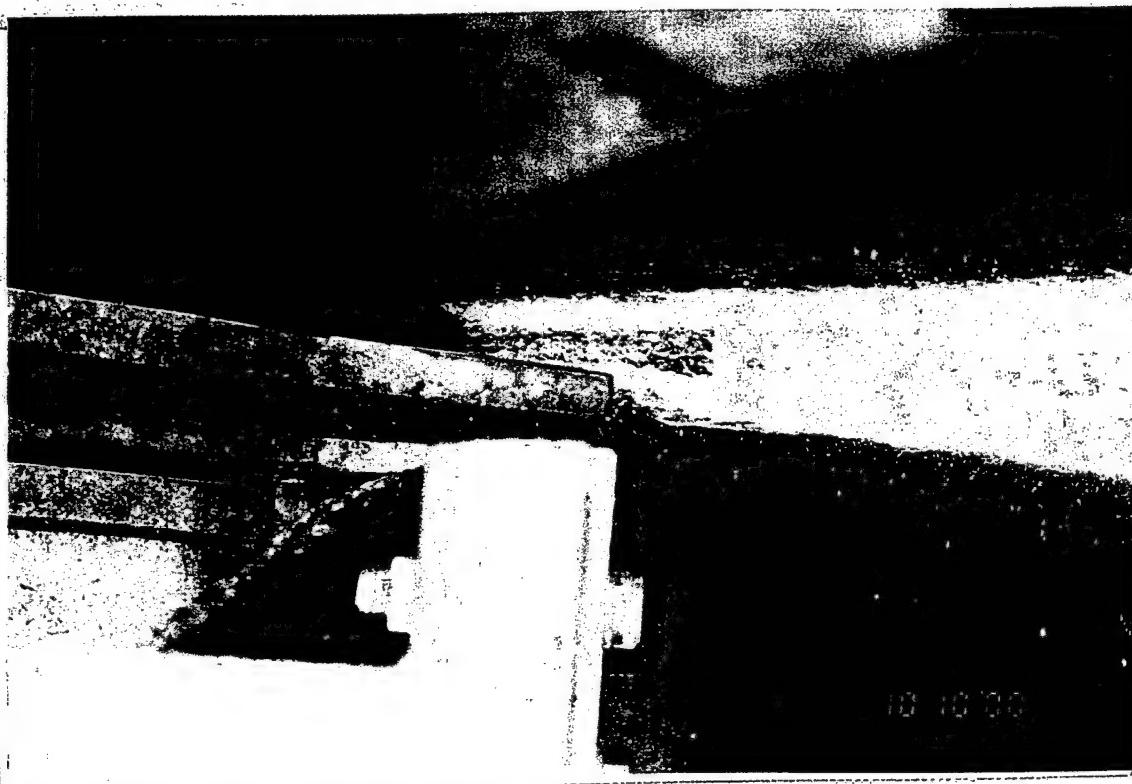
Little
Goose
Dam
10/10/00
8-10

Gate 8

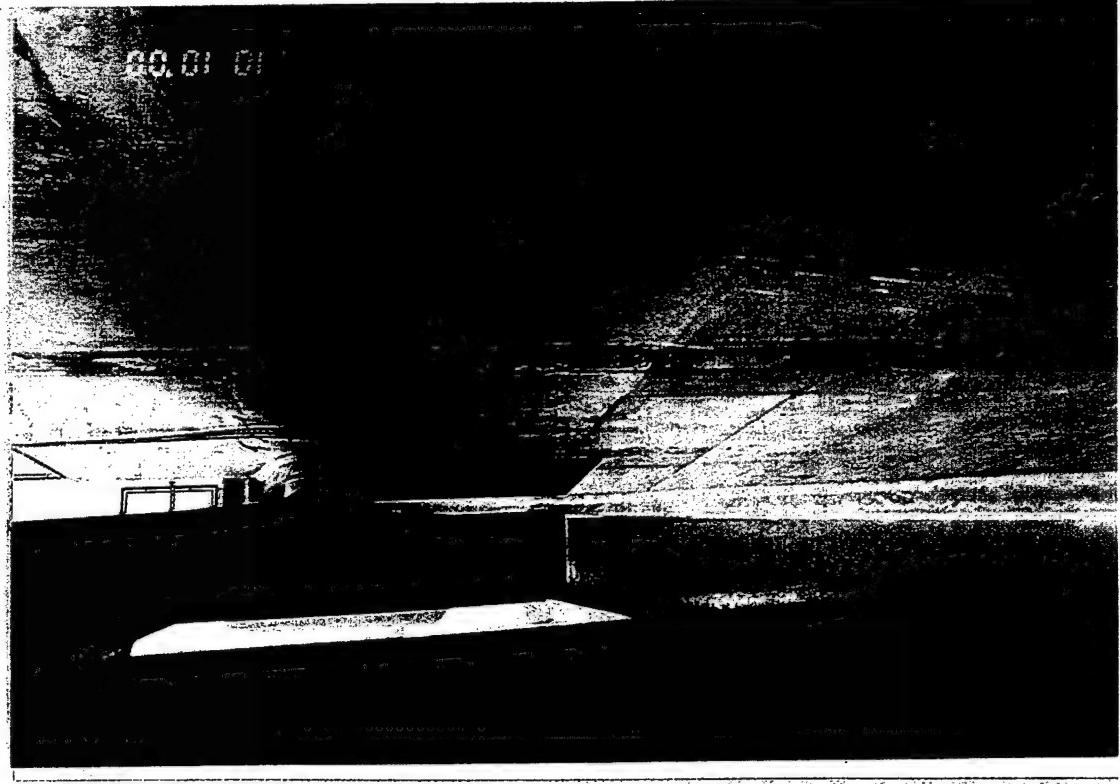
Bottom seal closure plate looking
upstream. Standing water between
closure plate, purlin webs and
skinplate, typical.



Little Goose Dam	Gate 8 Bottom seal closure plate, standing water between closure plate, purlin webs and skinplate, typical. Leak at center construction joint in spillway monolith.
10/10/00	
8-11	



Little Goose Dam	Gate 8 Side seal leak, bottom left side of gate.
10/10/00	
8-12	

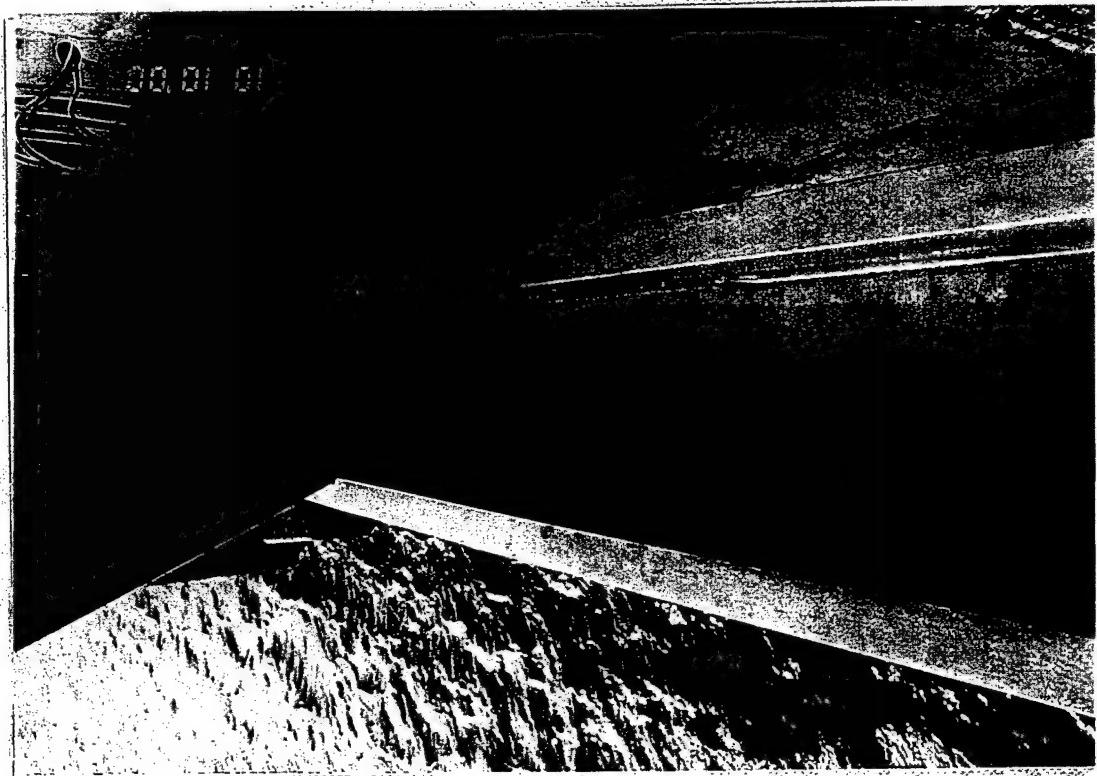


Little
Goose
Dam

10/10/00

8-13

Gate 8
Outside of right frame, typical.



Little
Goose
Dam

10/10/00

8-14

Gate 8
Right frame, middle radial strut,
standing water between girder
flanges due to drain above (see photo
8-15).



10 10 '00

Little
Goose
Dam

Gate 8
Drain in right pier wall, draining on
gate members.

10/10/00

8-15



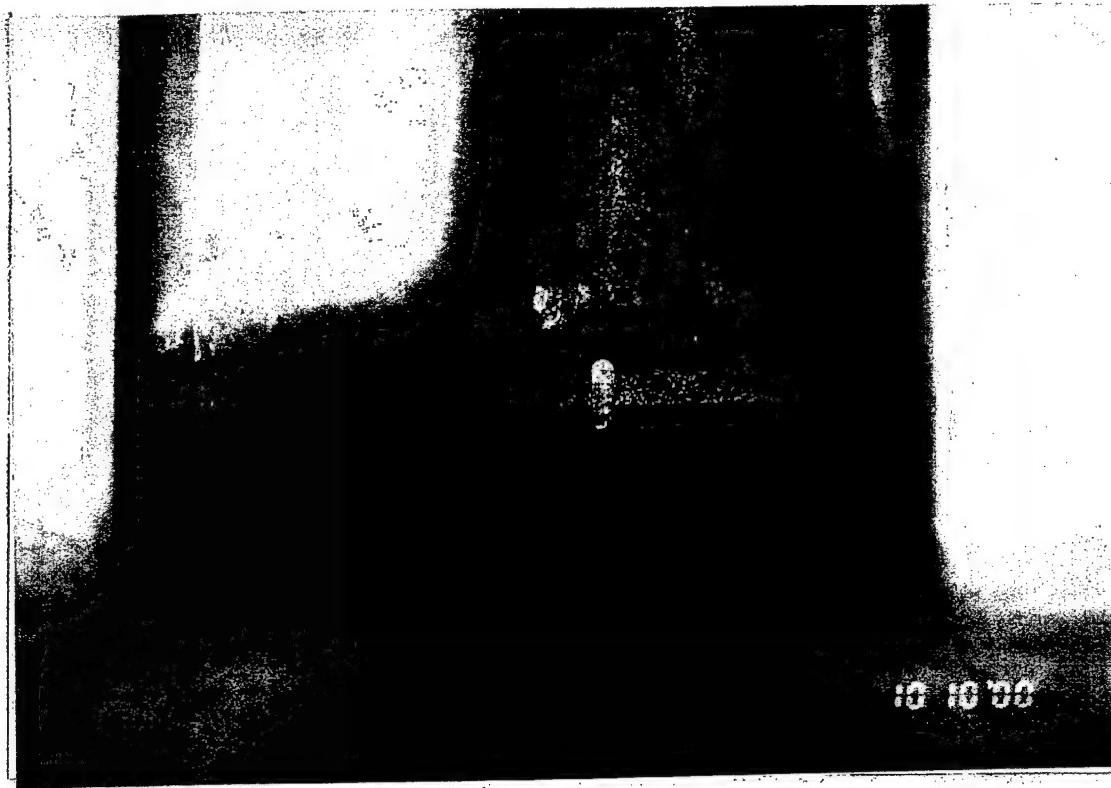
10 10 '00

Little
Goose
Dam

Gate 8
Typical upstream skin plate
condition, heavy concentration of
pitting.

10/10/00

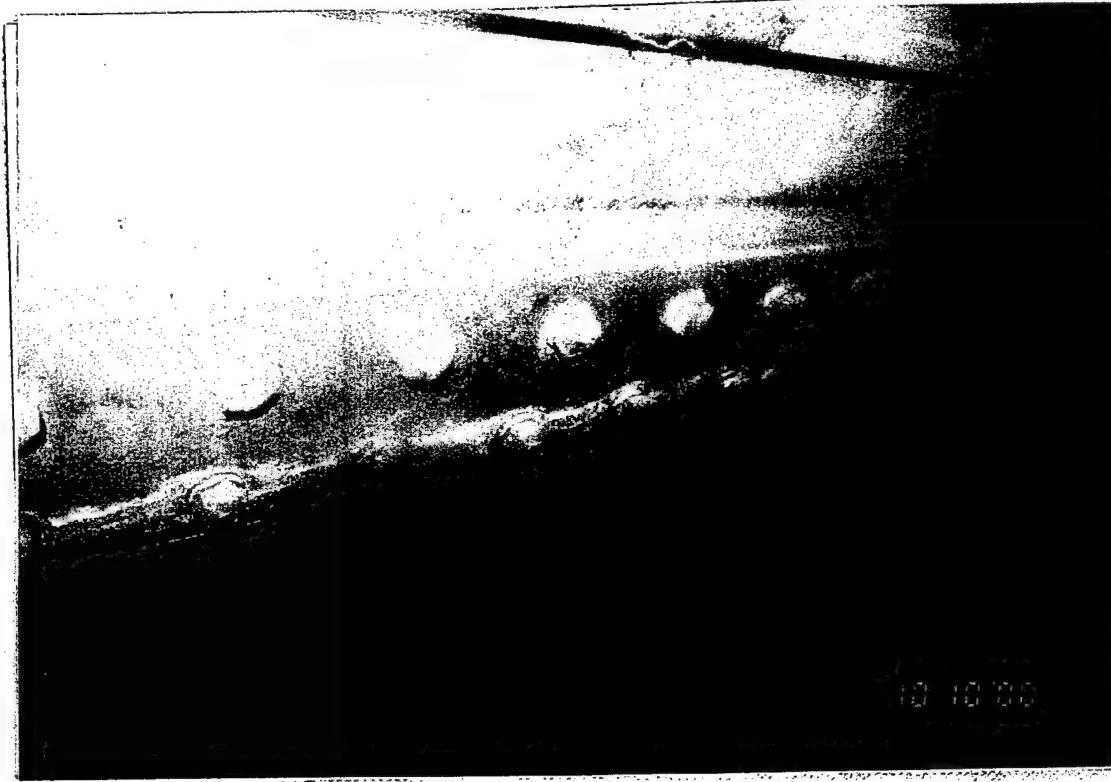
8-16



Little
Goose
Dam
10/10/00

Gate 8
Bottom seal closure plate looking
upstream. Standing water between
closure plate, purlin webs and
skinplate, typical.

8-17



Little
Goose
Dam
10/10/00

Gate 8
Bottom seal keeper plate, typical.

8-18*



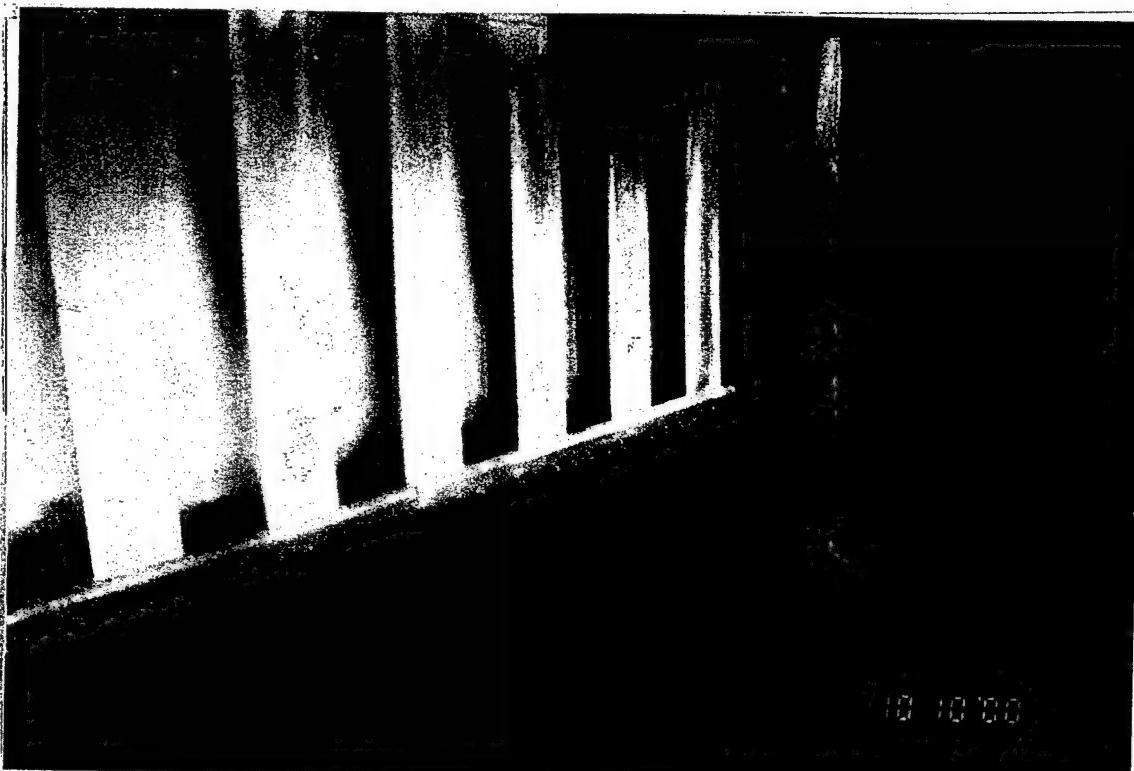
10 10 00

Little
Goose
Dam

Gate 8
Embedded bottom seal plate. Note:
heavy flow due to stop log leakage.

10/10/00

8-19



10 10 00

Little
Goose
Dam

Gate 8
Bottom left corner of gate. Bottom
seal closure plate looking upstream.
Standing water between closure
plate, purlin webs and skinplate,
typical.

10/10/00

8-20



10/10/00

Little
Goose
Dam

10/10/00

8-21

Gate 8
Skin plate pitting, typical.

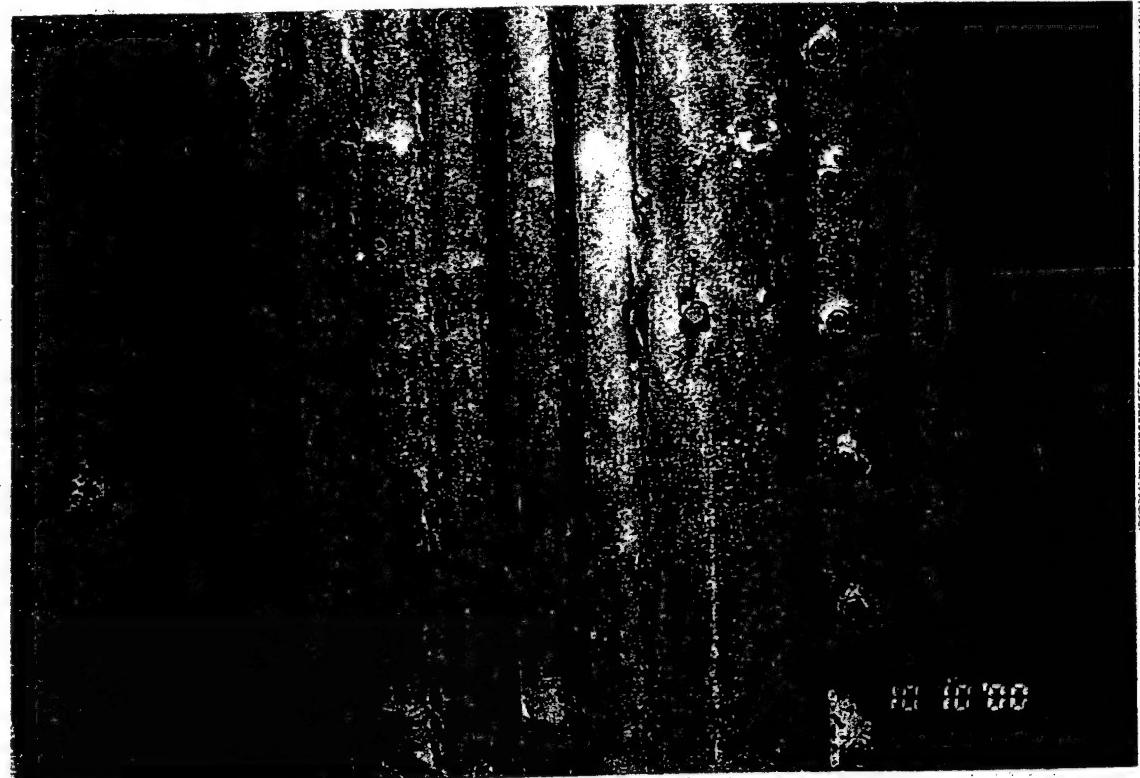


Little
Goose
Dam

10/10/00

8-22

Gate 8
Skin plate, typical.



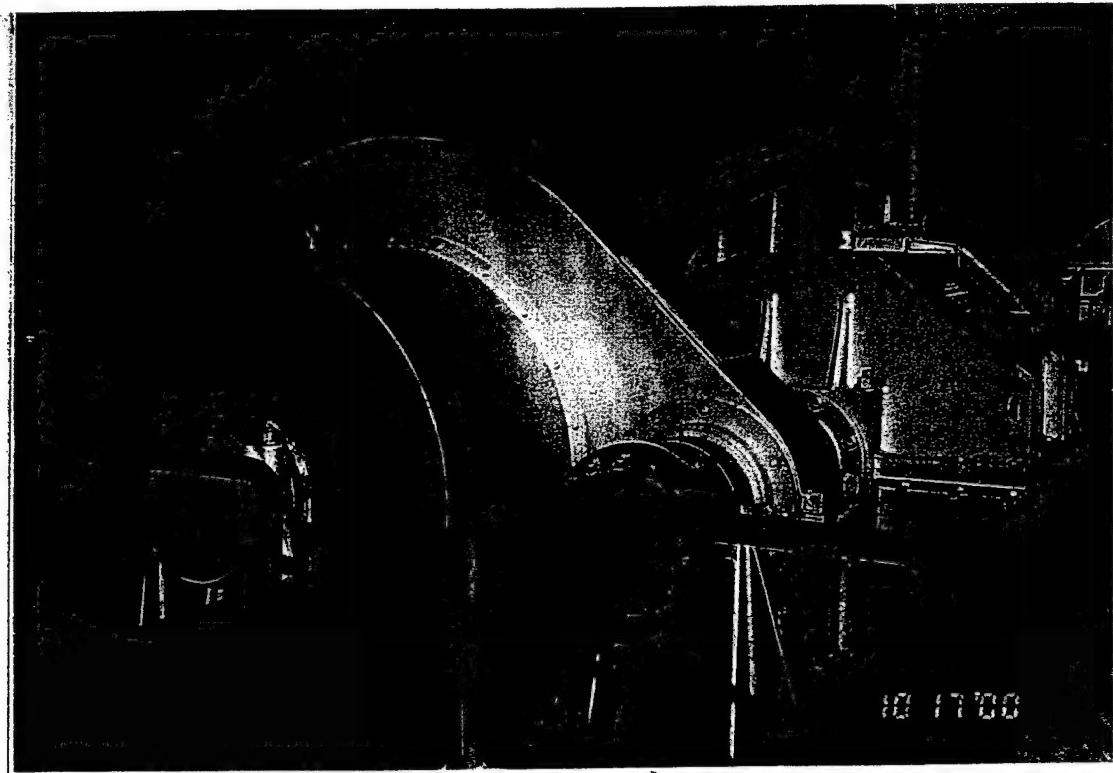
Little
Goose
Dam

10/10/00

8-23

Gate 8

Cable wear plate, typical condition.
Light to moderate corrosion, minimal
cable wear.



Little
Goose
Dam

Hoist and Mechanical
Hoist, typical.

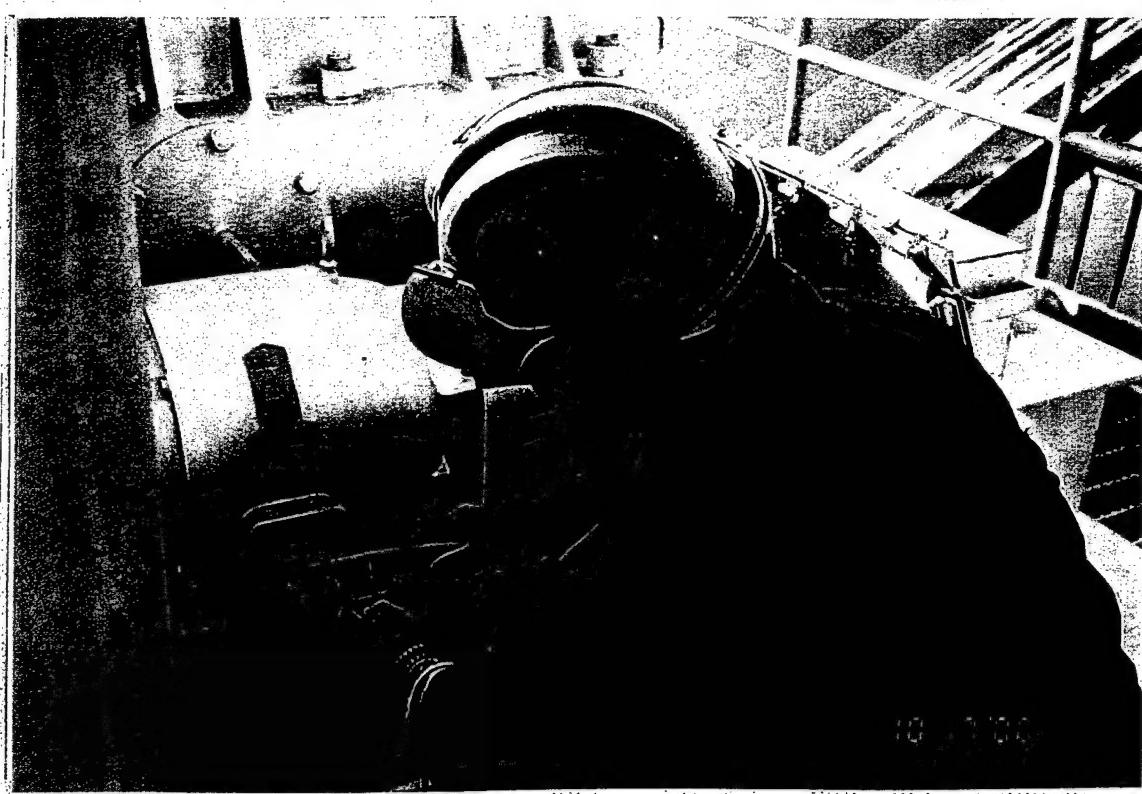
M-1



Little
Goose
Dam

Hoist and Mechanical
Amperage readings during
operational testing, typical.

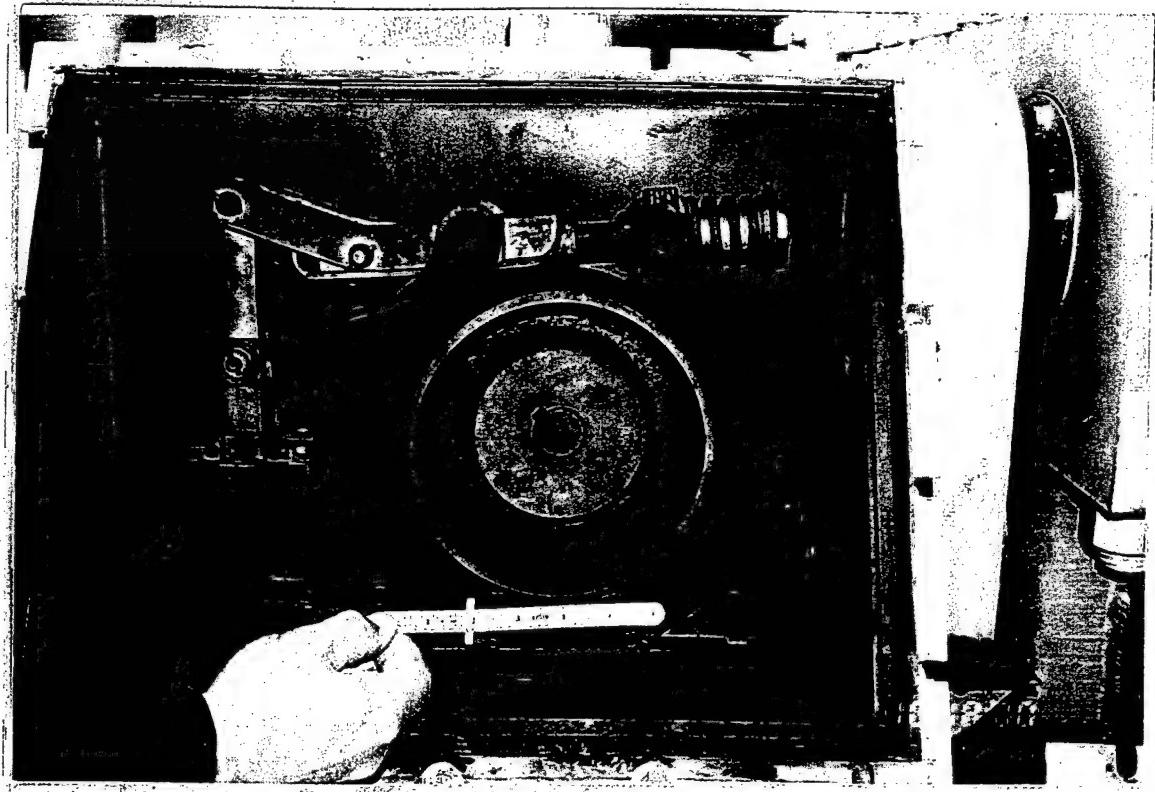
M-2



Little
Goose
Dam

Hoist and Mechanical
Amperage readings during
operational testing, typical.

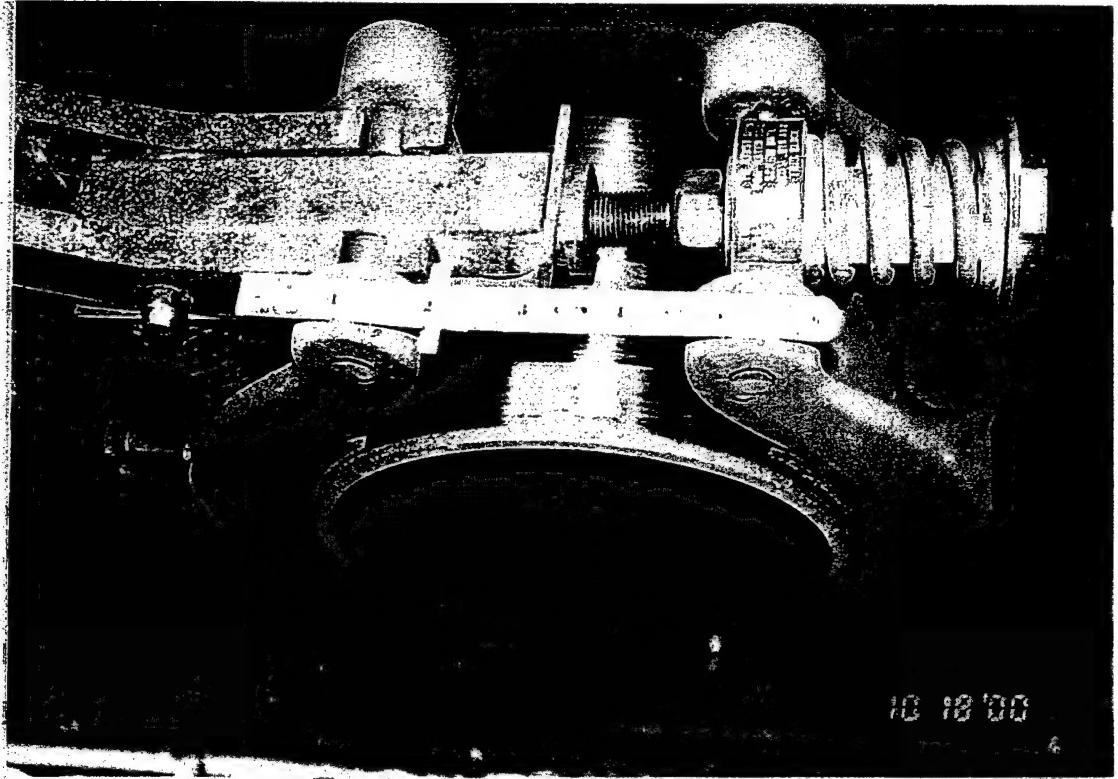
M-3



Little
Goose
Dam

Hoist and Mechanical
Seized motor brake on Gate 6 during
operational testing.

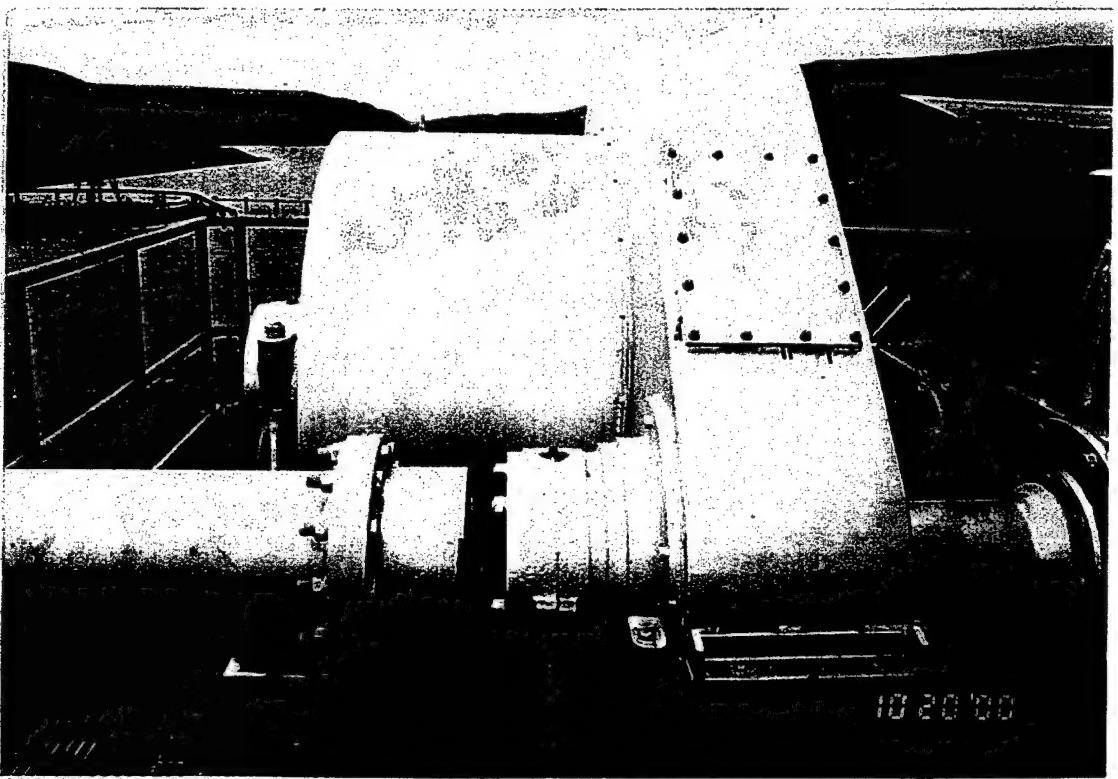
M-4



Little
Goose
Dam

Hoist and Mechanical
Seized motor brake on Gate 6 during
operational testing.

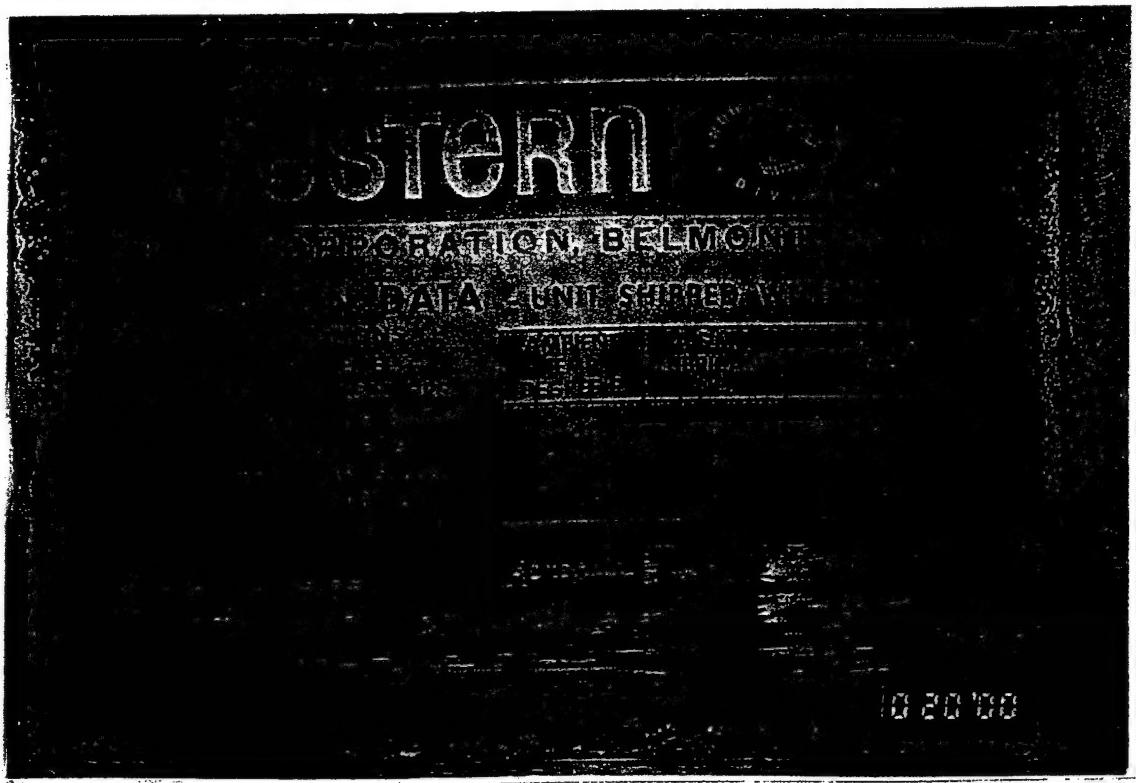
M-5



Little
Goose
Dam

Hoist and Mechanical
Hoist, typical.

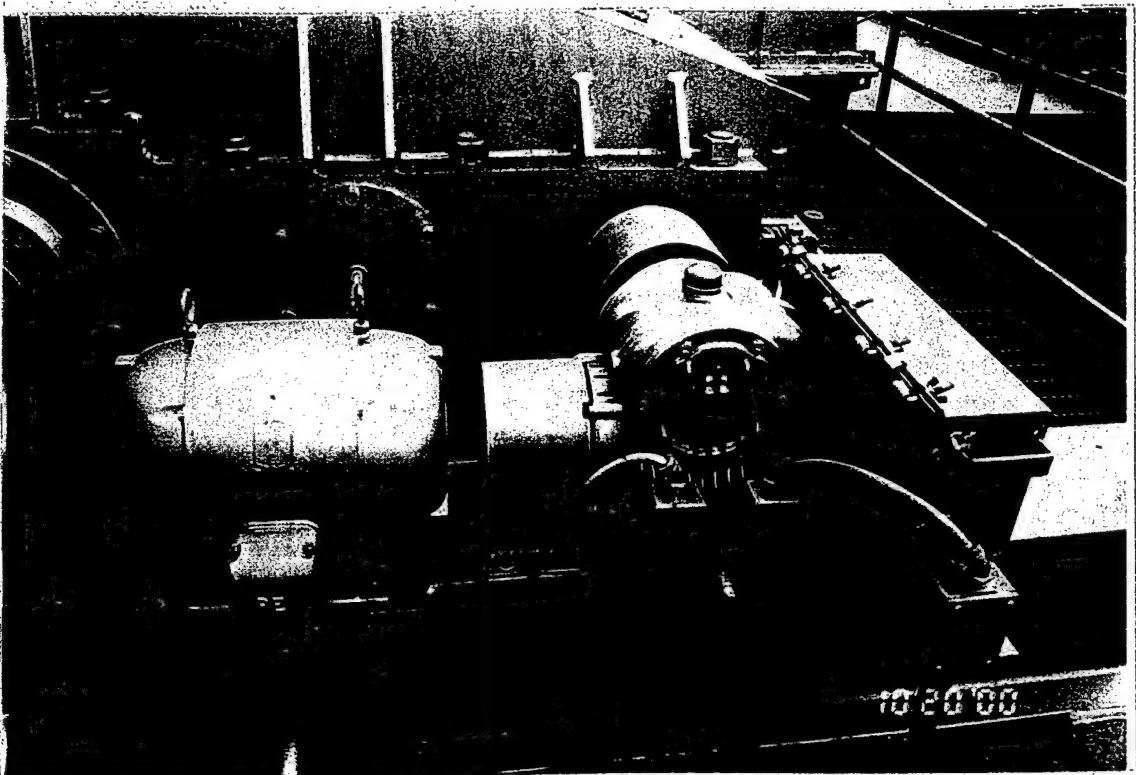
M-6



Little
Goose
Dam

Hoist and Mechanical
Hoist, name plate, typical.

M-7



Little
Goose
Dam

Hoist and Mechanical
Hoist, typical.

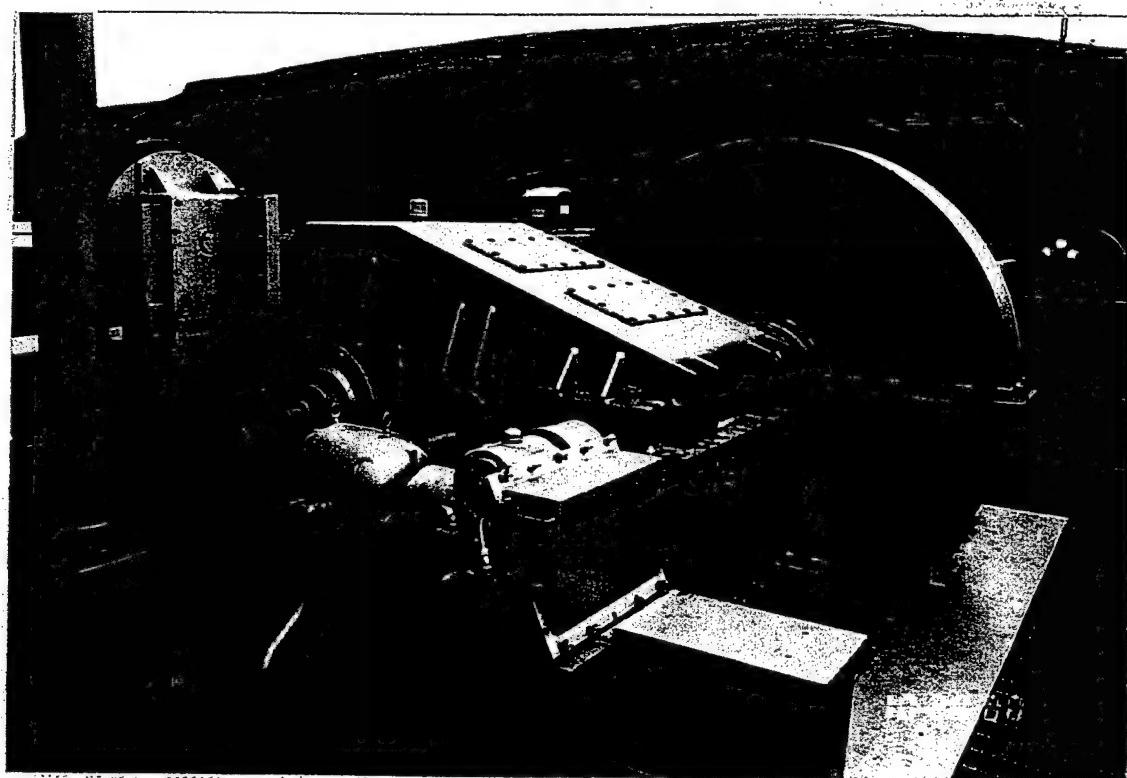
M-8



Little
Goose
Dam

Hoist and Mechanical
Hoist, name plate, typical.

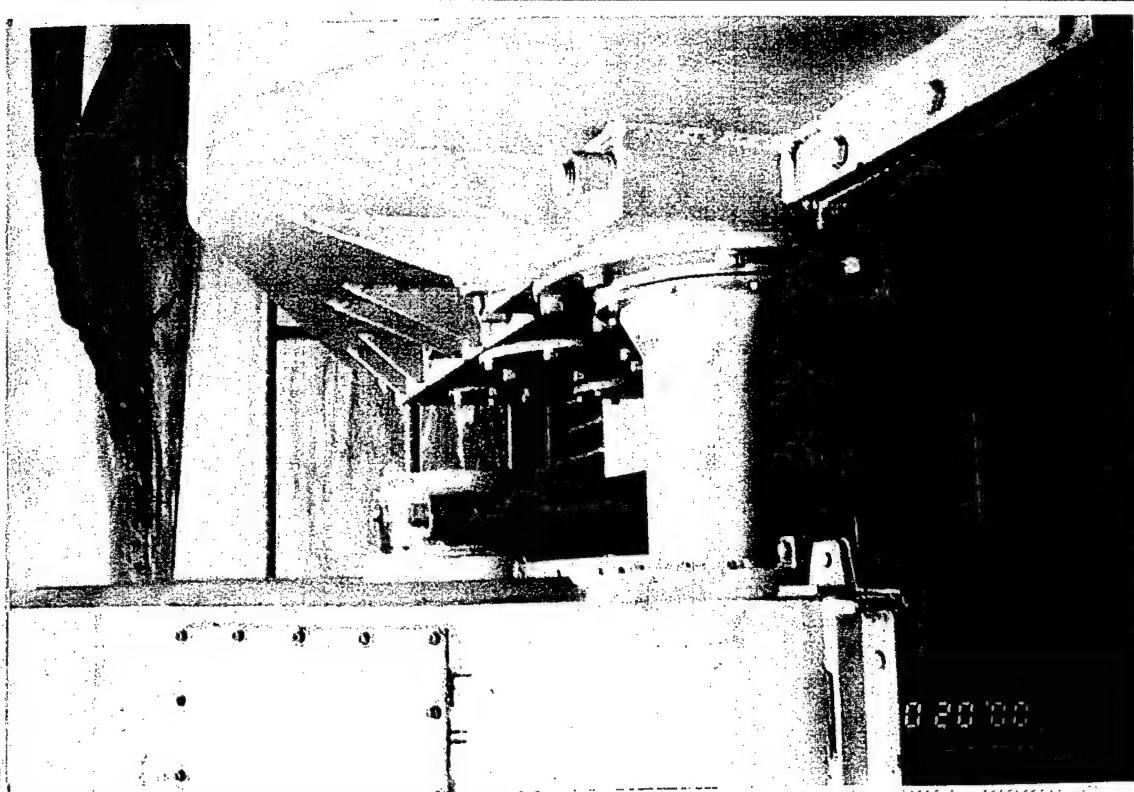
M-9



Little
Goose
Dam

Hoist and Mechanical
Hoist, typical.

M-10



Little
Goose
Dam

Hoist and Mechanical
Hoist, typical.

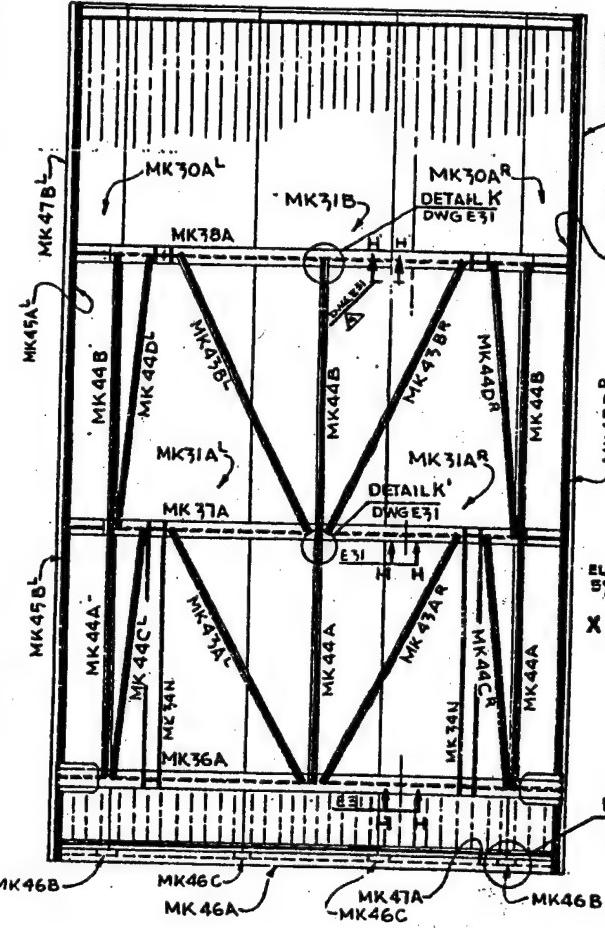
M-11

REVISIONS
REVISED
TO SUIT
APPL
10-3-66
CAHILL
DW

ADDED
WORKPOINT
DIM'S FOR
STRETCH BEACHING
TO ELEVATION
VIEW
4-19-67
H B&B.
CAHILL

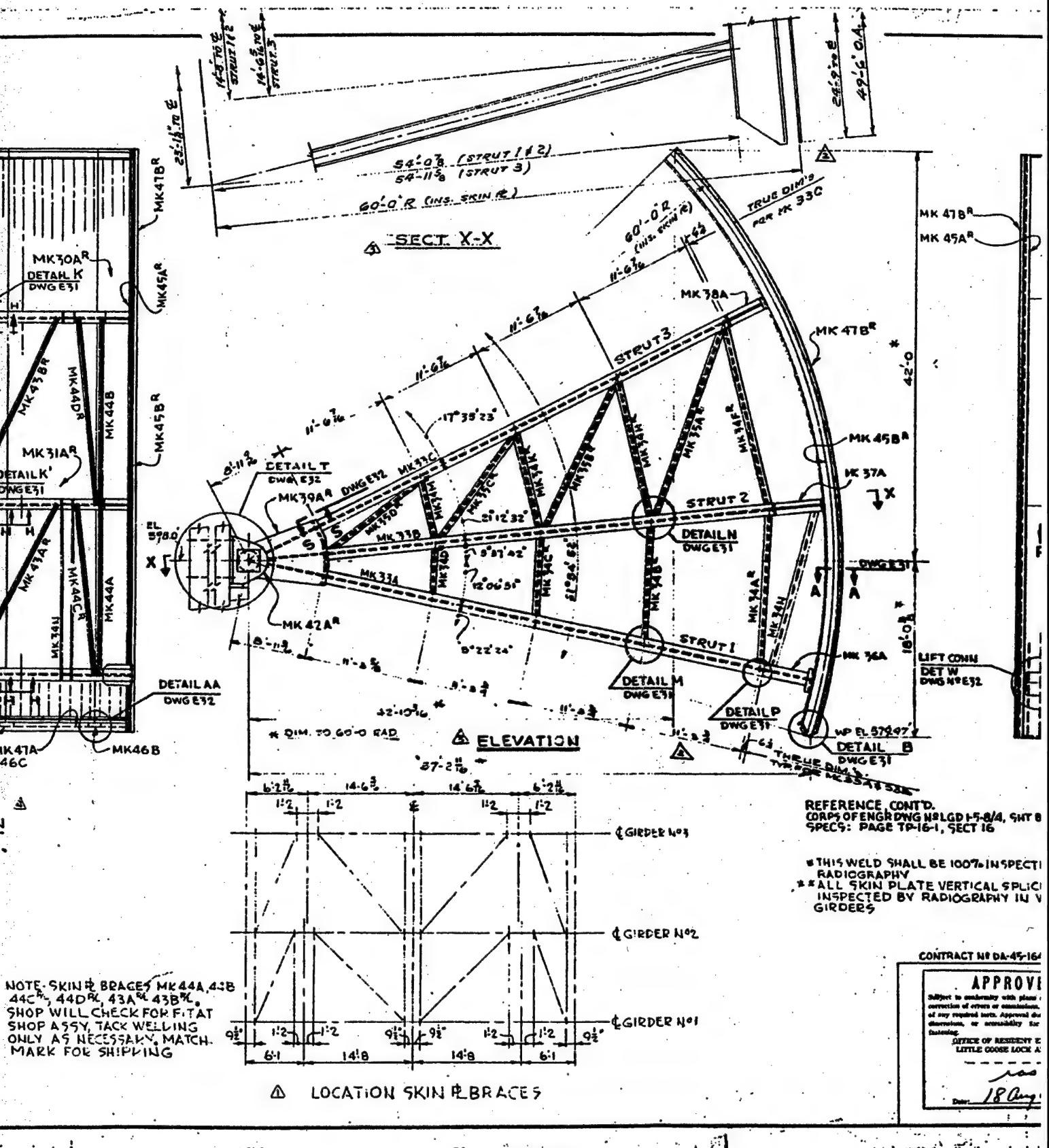
ADDED SECT X-X
GENERAL DIMENSIONS
AT ELEV
5-18-67 JEG
CAHILL

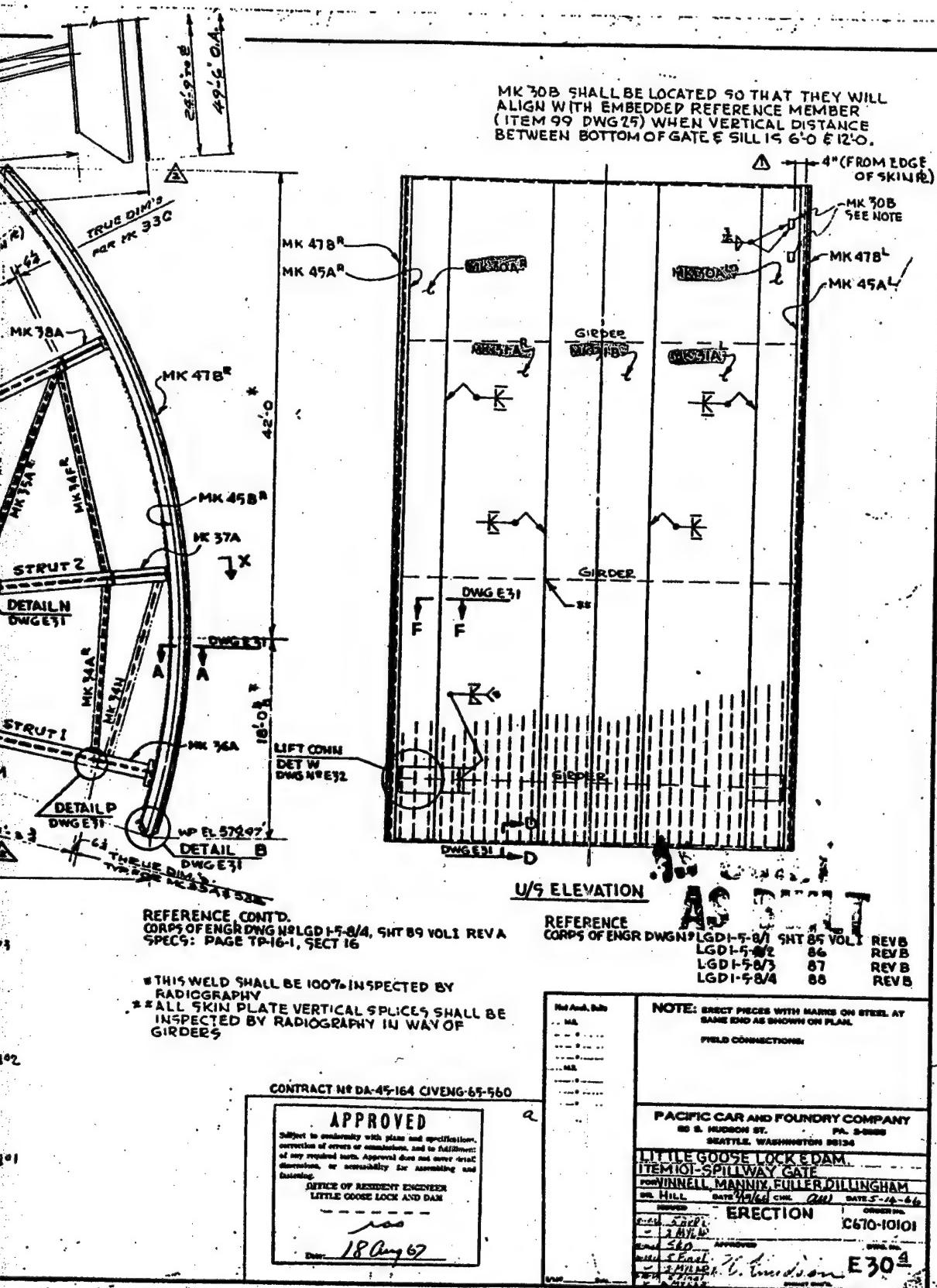
ADDED SECT
MARKS TO SUIT
E31
7-17-67 CAHILL
H B&B.



D/S ELEVATION

NOTE. SKIN & BRACES MK 44A, 43B,
44C^R, 44D^R, 43A^R & 43B^R.
SHOP WILL CHECK FOR F-TAT
SHOP ASSY, TACK WELLING
ONLY AS NECESSARY. MATCH
MARK FOR SHIPPING



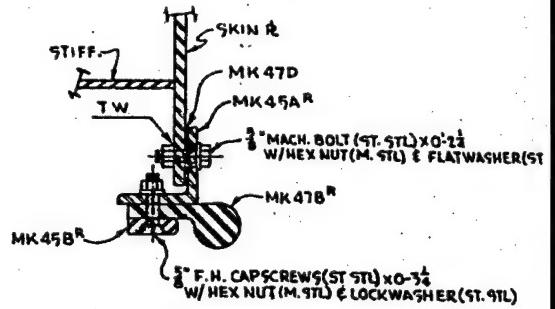


3

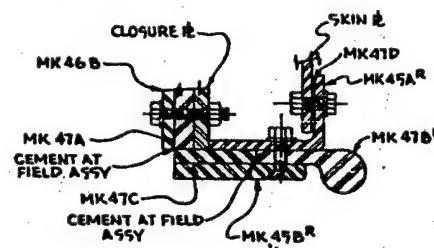
REVISED
 TO SUIT
 APPL
 10-3-66
 CANILL
 CWL

 REVISED
 DETAIL 'N' IN
 @ SHIP REB.
 4-9-67 H BOS
 CANILL

 REVISED
 ERIC: DETAIL
 7/27/67 CAN
 H BOS

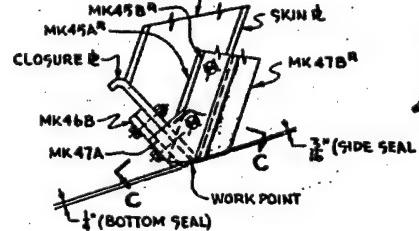


SECT. A-A



SECT. C-C

TYP.



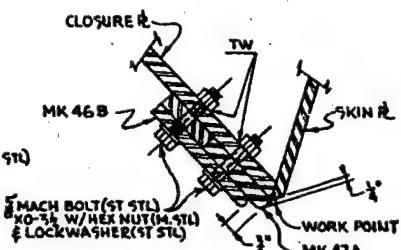
DETAIL B

(1)

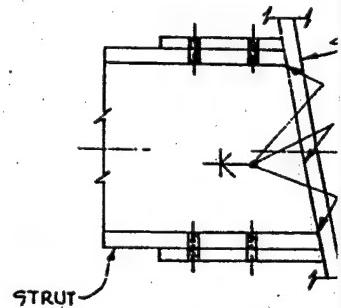
BOLT (ST. STL) X 0-22
NUT (M. STL) & FLAT WASHER (ST. STL)

8

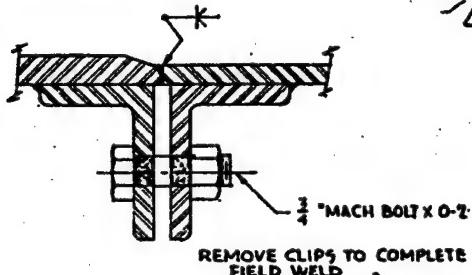
(ST. STL) X 0-24
NUT (M. STL) & LOCK WASHER (ST. STL)



SECT D-D



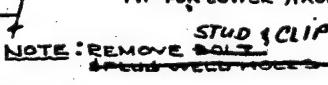
DETAIL P
TYPICAL FOR U/S END OF A
SPlice TO GIRDERS AS NOTED



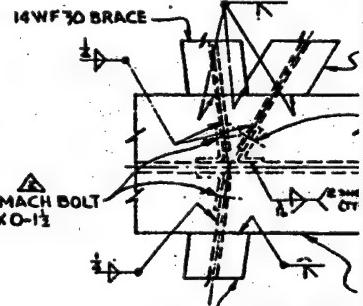
SECT F-F
TYP. FOR SKIN PLATE SPlice

NOTE: REMOVE ERECTION
CLIPS & PLUG WELD HOLES

MK 33A

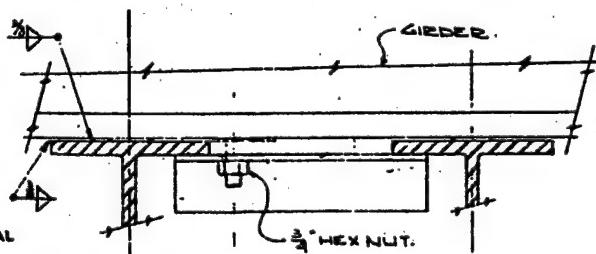


DETAIL M ▲
TYP FOR LOWER STRUT
STUD & CLIP



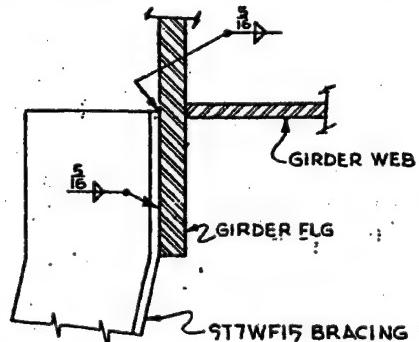
DETAIL N ▲
TYP FOR CENTER STRUT
UPPER STRUT SIM. EXCEPT
AS NOTED

SECT H-H (SHT.E.30) ▲
TYPE SPlices OF SKIN SECTIONS



SECT H-H ▲
SHT.E.30

NOTE: REMOVE STUD & CLIP.
TO COMPLETE FIELD WELD.



DETAIL K ▲

CONTRACTING DA-15-164 CIVENG-65-560

APPROVED
AS CORRECTED

Subject to conformance with plans and specifications
exclusion of errors or omissions, and to substitution
of any required parts. Approved does not cover other
dimensions, or availability. See accompanying data
sheeting.

OFFICE OF RESIDENT ENGINEER
LITTLE COOSIE LOCK AND DAM

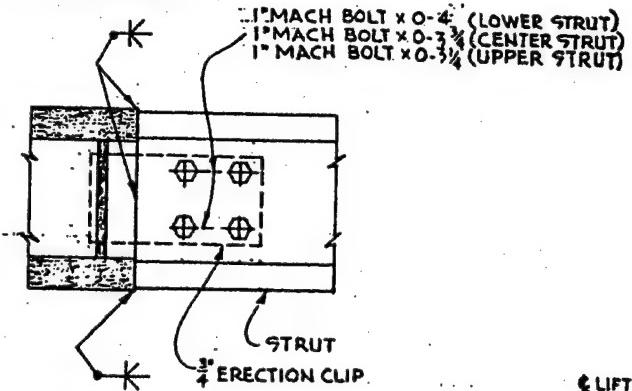
18 Aug 67
Date

(2)

REVISIONS
REVISED
44
10-3-66
CA HILL
C&C

ADDED
FIELD WELD
DETAILS
CA HILL 9/26/67

TRUNNION (MK39A^R)



REMOVE CLIP TO COMPLETE FIELD
WELD-PLUG WELD HOLES IN WEB

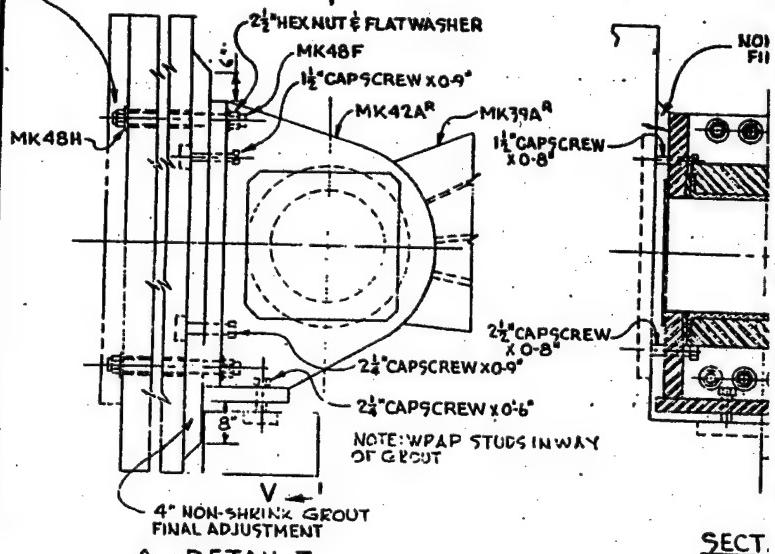
LIFT ROPES
(NOT BY P.

SECT 5-5

MK41C
1" MACH BOLT
X 0-1 1/2" (NON

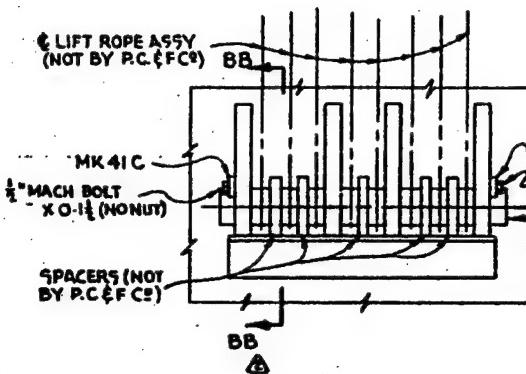
SPACERS IN
BY P.C.E.F.C

TENSION STUDS TO A 80 KIP LOAD. CUT
OFF EXCESS STUD AFTER TENSIONING
& COVER WITH 1" MIN CONCRETE OVER
ENDS OF STUDS. (AFTER GROUTING)

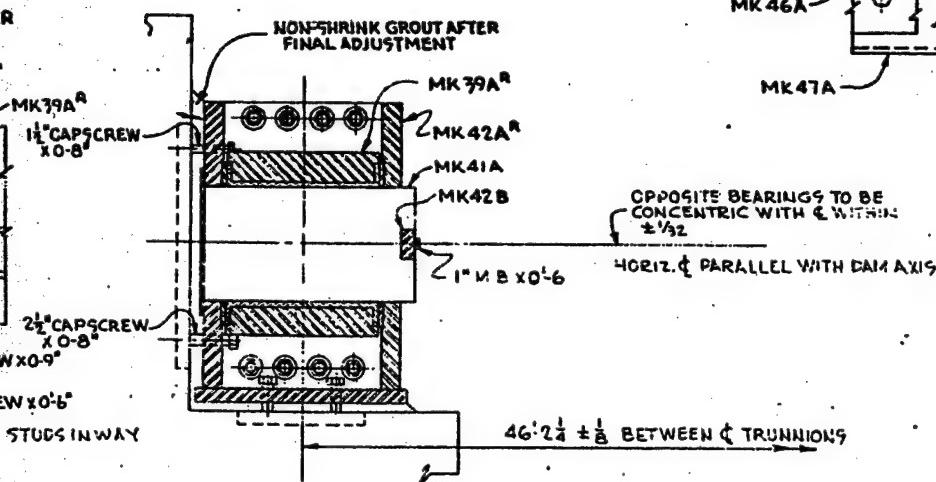


SECT.

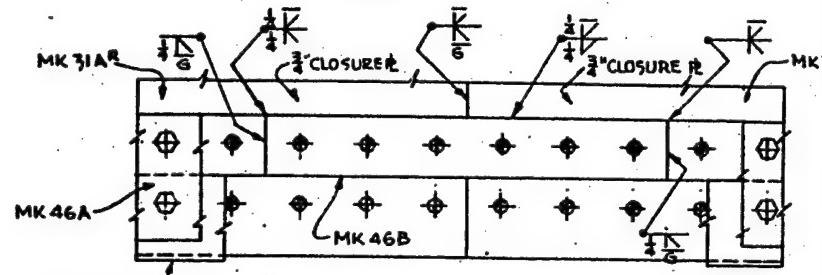
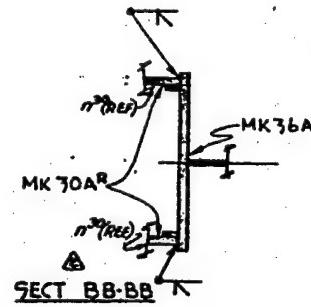
X 0-4" (LOWER STRUT)
 X 0-3 1/4" (CENTER STRUT)
 X 0-3 1/4" (UPPER STRUT)



DETAIL W



SECT. V-V



DETAIL A-A
TYPICAL FOR ALL SPLICES

CONTRACT NO. DA45-164 CIVENG 65-

APPROVED

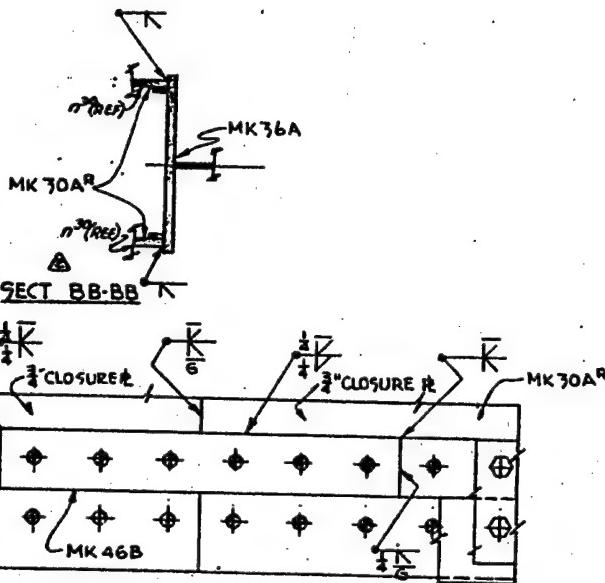
Subject to contract with plans and specifications.
Execution of certain contracts may require addition
of any required parts, fixtures or fittings or other detail
as may be necessary for the time and
function.

OPTION OF BUYER TO BUY PER
LITTLE OR ONE AND ONE HUNDRED
THREE QUARTERS

21 Sep 67

DIG 3

(2)



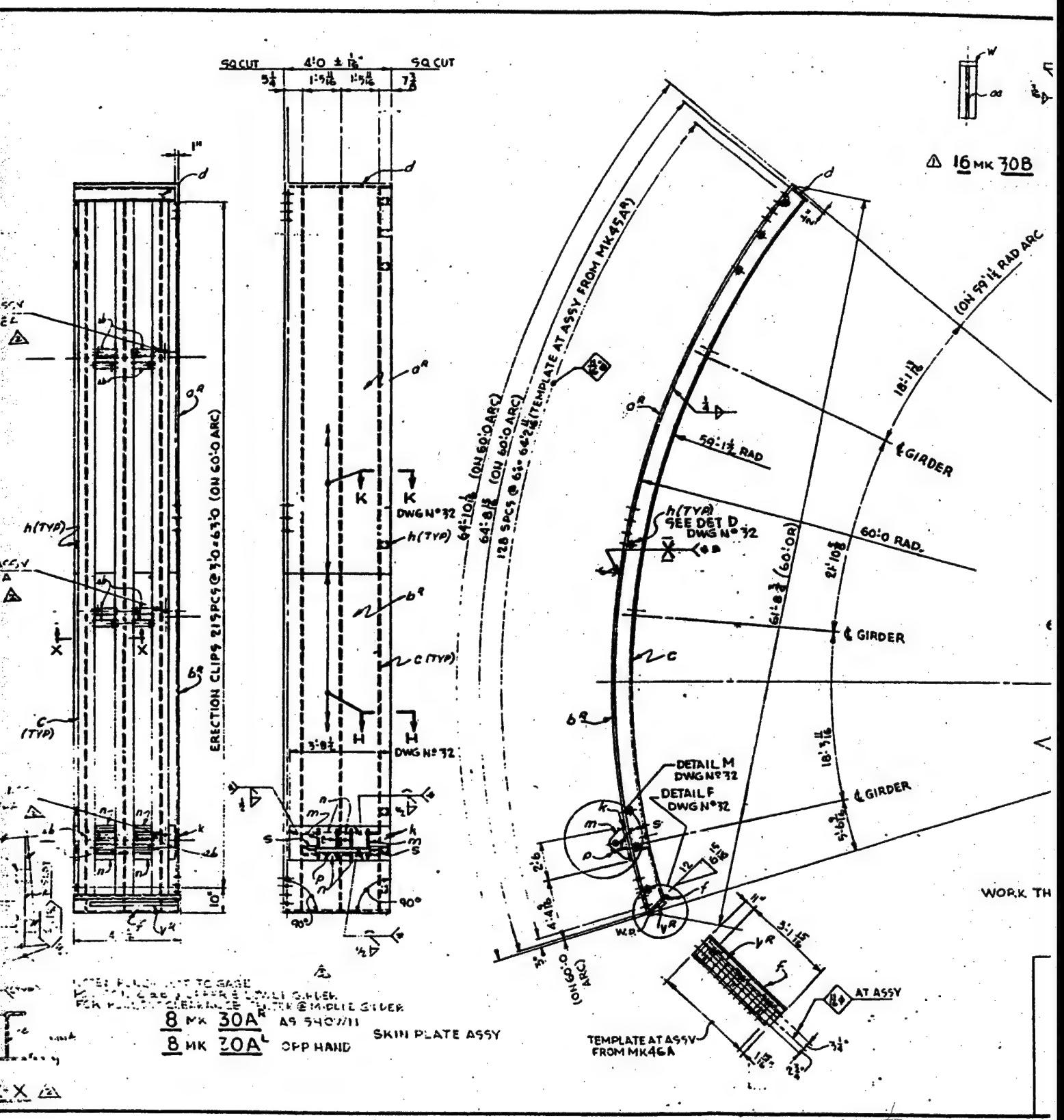
DETAIL A-A
TYPICAL FOR ALL SPLICES

REFERENCE: CORPS OF ENGR DWG LGD 1-5-8/A, SHT 85, VOL I, REV B
SPECS; PAGE TP-104, SECTION

LIG-65-560-101-003 324

MAR 19 1980

1



2



WORK THIS DWG WITH DWG N^o 32

APPROVED	
FEB 21 1967	

BILL OF MATERIAL						
ITEM	DESCRIPTION	SIZE	QUANTITY	MANUFACTURER	REMARKS	WEIGHT
8	30A 1/8 0.2 R 4BX 1/4 ALLOY	38 1/4 INCHES	23.4	ROLL	SANTO	77.90
8	30A 1/8 0.2 R 4BX 1/4 ALLOY	26 1/2 INCHES	2.5	ROLL	SANTO	54.71
16	C ST10WPA1 1/4X1/4	CYL ROLL	54000.00			
16	D 1/8 X 1/8	3 11	285	STOCK	1.14	
16	F 1/8 X 1/4	4 0.25	BENDIES			23.94
16	H 2 1/2 X 3/8	0 3				274
16	K 1/8 30X1/8 ALLOY	3 8 1/2 INCHES	2.2	ROLL	SANTO	32.2
32	L 1/8 1/4X1/8 ALLOY	2 4	①			4.60
64	M 1/8 1/4X1/8 ALLOY	1 5 1/2	②			33.75
16	P BAR 4X3/4	2 3		STOCK	3.1	
16	S 1/8 30X1/8	1 3 1/2 CYLINDERS	③	STOCK	.29	
32	T 1/8 1/4X1/8 ALLOY	2 4	①			4.58
16	V 1/8 BAR 3X3/4	3 1/2				4.65
172	W 1/8 1/4X1/8 ALLOY	1 2 1/2				34.00
64	X 1/8 1/4X1/8 ALLOY	0 24				5.5
16	Z 1/8 1/4X1/8 ALLOY	0 8 1/2	①			2.9
16	W 1/8 1/4X1/8	0 2				.41
	SHOP WELD					1.04
						TOTAL 263.91

MATERIAL SPEC:

PLATE & SHAPES; ASTM-A36 EXCEPT AS NOTED
PLATE & SHAPES; LOW ALLOY STL.-SEE PG TP-9-36
PARA 9-09 OF GEN. SPEC.
ST. STL -ASTM A276-TYPE 410, HOTROLLED-PICKLED
ANNEALED & PASSIVATED

NOTE

* THESE WELDS TO BE 100% INSPECTED BY RADIOGRAPHY EXCEPT WHERE WELD GEOMETRY PROHIBITS
ULTRASONIC TESTING MAY BE USED.
** 100% SHOP WELD; GRIND NEAR SIDE SMOOTH
GRIND FAR SIDE FLUSH ONLY IN WAY OF RIBS.

REFERENCE:

CORPS OF ENGR DWG N^o LGD LS-B1 SHT 05 VOL I REV B
1-5-62 86 B
1-5-63 87 B
1-5-64 88 B
SECT 16
SPEC'S PAGE TP16-1 TP9-38 PARA 9-09

AS BUILT

Not Pd/Rd Reqd	Corps of Engr
DRILLED	OPEN HOLES
END AND EDGE DISTANCES	EXCEPT AS NOTED
SPACING NOT SHOWN	EXCEPT AS NOTED
PAINT	NO SHARP PAINT
PACIFIC CAR AND FOUNDRY COMPANY 60 E. HUDSON ST. WA. 2000 SEATTLE, WASHINGTON 98103	
LITTLE GOOSE LOCK EPAM ITEM 101-SPILL WAY GATE VINNELL MANNI FULLER BILLINGHAM OR CASHILL DATES 2/14/66 C.R. 101 DATE 3-10-66	
SKIN PLATE ASSY C610-10101	
30 4	

LTS-65 325 10-62-560-101-0004-385

MAR 19 1960

(3)

REVISED
ERCTION USE
TO SUIT APPLI
16-1-66 CANADA
ON

REVISED
ERCTION
DETAIL

7/17-67 CAN.

TERMINATE ASSEMBLY
FROM MK 38A

No slopes permitted

TEMPLATE CLASS

FROM MK 37A

TEMPLATE CLASS
FROM MK 37A

(TYP)

DETAIL-D
DWG N° 32

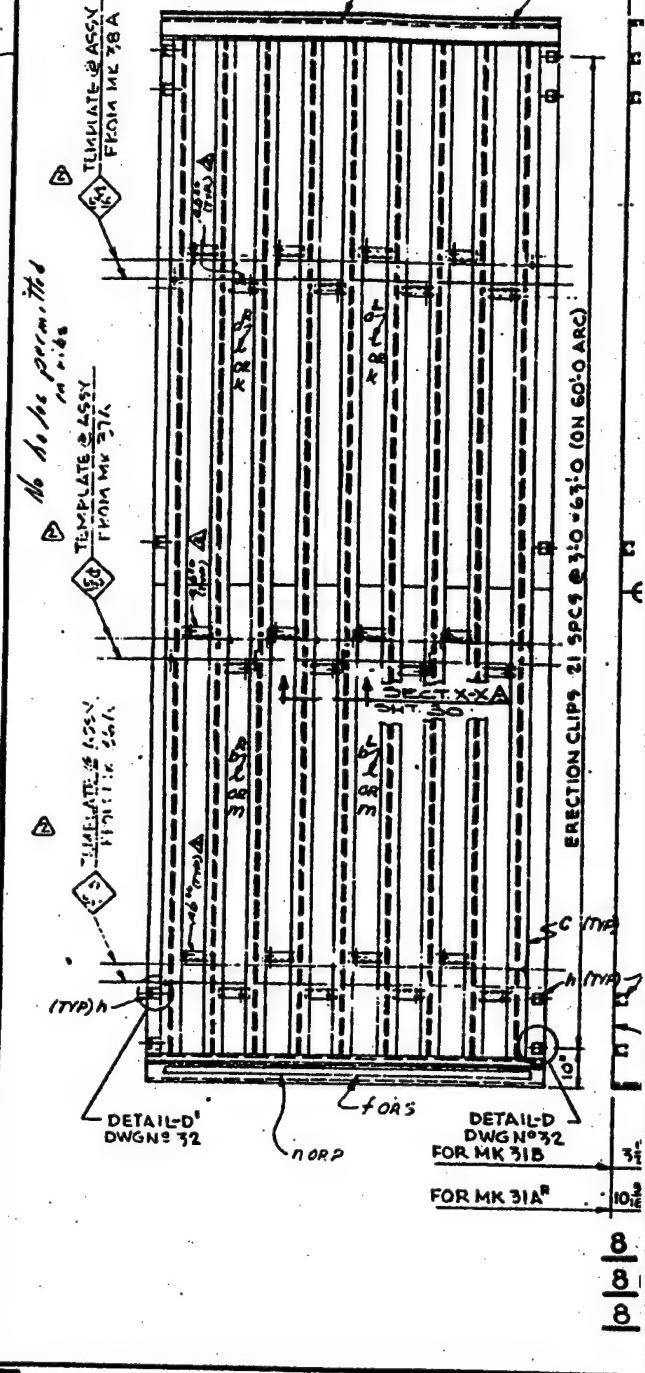
FOR MK 31B

DETAIL-D
DWG N° 32

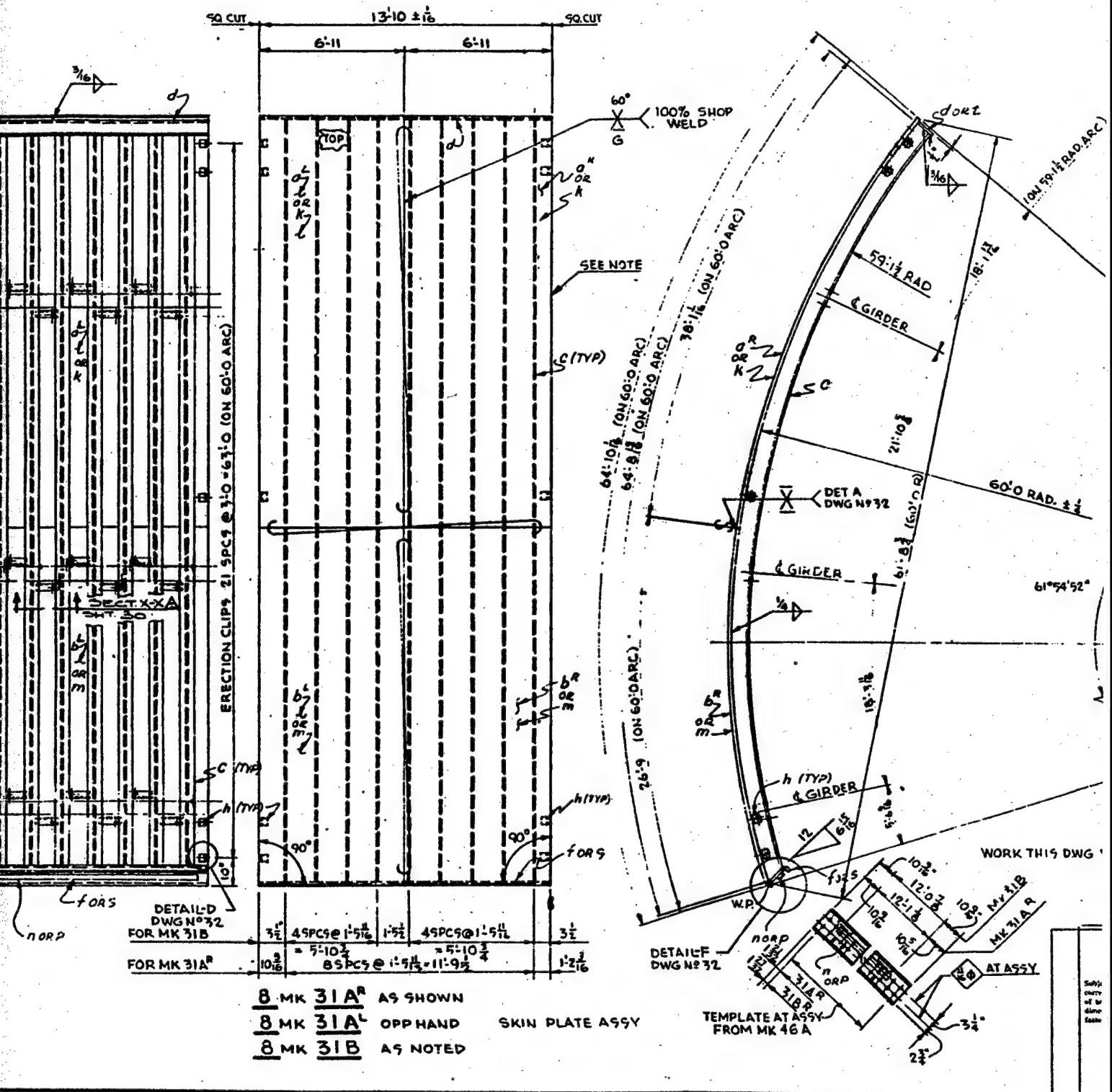
FOR MK 31A

ERCTION CLIPS 21 SPC 9 & 310-6110 (ON 6010 ARC)

SQ CUT



8 | 8 | 8



2

BILL OF MATERIAL

ITEM	QUANTITY	DESCRIPTION	WEIGHT
8	31A	16 0.250 B3X 3/8 LOW CARB ROLL	134.22
8	31A	16 0.250 B3X 3/8 LOW CARB ROLL	124.22
144	C	ST10WF31 ALLOY 6010Y ROLL	15.12
16	D	R11X 3/8	13.10
16	F	R14X 3/8	13.10 BEND
704	H	4X3X 3/8	0.3
352	I	2.3X3X 3/8	1.25
16	J	BAP 3Y 1/2 16 3/8 12 1/8	1.15
8	31B	16 K R83X 3/8 LOW CARB ROLL	67.30
16	M	R83X 3/8 LOW CARB ROLL	63.10
80	C	ST10WF31 LOW CARB 0.250 ROLL	15.31
8	F	R11X 3/8	13.10
8	S	R14X 3/8	13.10 BEND
352	H	4X3X 3/8	0.3
216	I	2.3X3X 3/8	1.25
8	P	BAP 3Y 1/2 16 3/8 12 1/8	7.23
		SHOP WELD STSIL	-
		SHOP WELD	-
		SHIP	-
118		1/4" M.B	0.2
		TOTAL	868.786

MATERIAL SPEC:

PLATE & SHAPES - ASTM-A36 EXCEPT AS NOTED

PLATE & SHAPES - LOWALLOY STL - SEE PG TP-9-38

TP 9-09 OF GENERAL SPEC.

M.B. ASTM-A307 GRA

ST. STL ASTM-A176 TYPE 410 HOT ROLLED,

ANNEALED, PICKLED & PASSIVATED

NOTE

BOTH VERTICAL EDGES OF M31B SHALL BE PREPARED FOR FIELD WELD BY CUTTING A DOUBLE CHAMFER: 45° X 3/8 IN WAY OF 3/8 R AND 45° X 1/4 IN WAY OF 1/4 R. NO EDGE PREPARATION FOR WELD REQD FOR MK31A⁴⁵. LIKEWISE BOTH EDGES OF PC¹'S SHALL BE DOUBLE CHAMFERED 45° X 3/8" AND PC²'S SHALL BE DOUBLE CHAMFERED 45° X 3/8" IN WAY OF FIELD SPICES

REFERENCE:

CORPS OF ENGR DWG NO LGD 1-5-8/1, SHT BS, VOL I REV B

1-5-8/2, SHT 86, B

1-5-8/3, SHT 87, B

1-5-8/4, SHT 88, B

SPEC'S PAGE TP16-1, SECT 16

PAGE TP9-38, PARA 9-09

NOTES	DET. WELDING REQD. INSPECTION CORPS OF ENGR.
Welds	SPOTS, DOLTS, OPEN HOLE, EXCEPT AS NOTED
End and Edge Distance EXCEPT AS NOTED
Spacings, Distances	NO SHOP PAINT.
Paint	
PACIFIC CAR AND FOUNDRY COMPANY 60 E. HUDSON ST., SEATTLE, WASHINGTON 98104	
LITTLE GOOSE LOCKED DAM ITEM 101 - SPILLWAY GATE VINNELL MANNIX, FULLER, CLINGHAM, BL. CANTILEVER DATE 12/14/68 CANT. 200 DATE 5-10-69	
BM# 30 FOR SHOP CONSTRUCTION DATE 10-19-68 CANTILEVER 31 ²	
SKIN PLATE ASSY C670-10101	

LIG 600-560-101-005, 386

MAR 19 1980

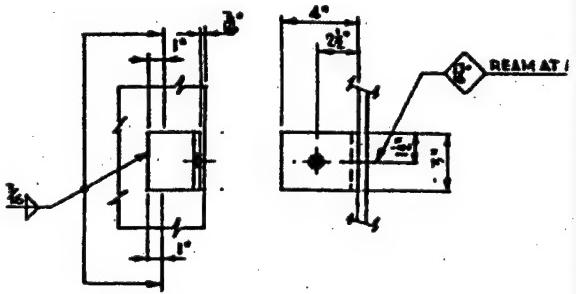
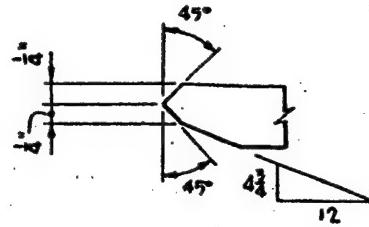
3

~~ADDED
ERCTION
CLIP DETAIL~~
10-1-66 CANU
ON

~~DELETED
ELECTRIC
DETAIL~~

~~7/16" CAN~~

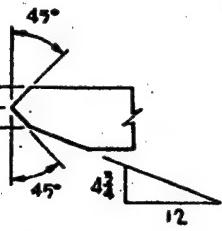
~~REVISED
EDGE DETAIL
FOR 7/16" SCA.
FIELD WELD
OF 3/8" CAN~~



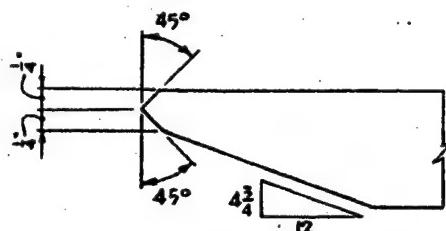
DETAIL D AS SHOWN
DETAIL D' OPP HAND
DWGS N° 30 & 31

GRIND SMOOTH

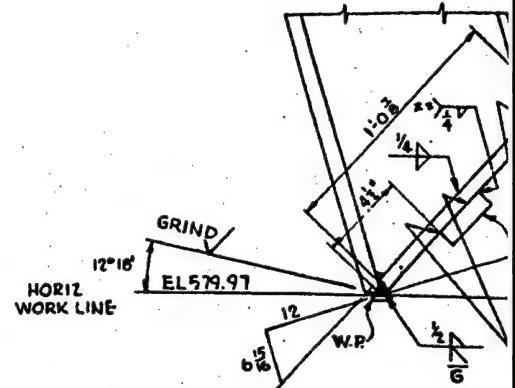
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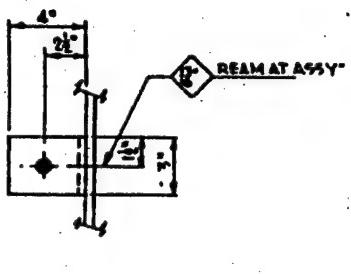
SECT K-K DWG N° 30



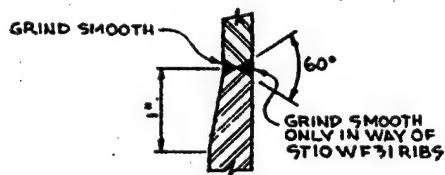
SECT H-H DWG N° 30



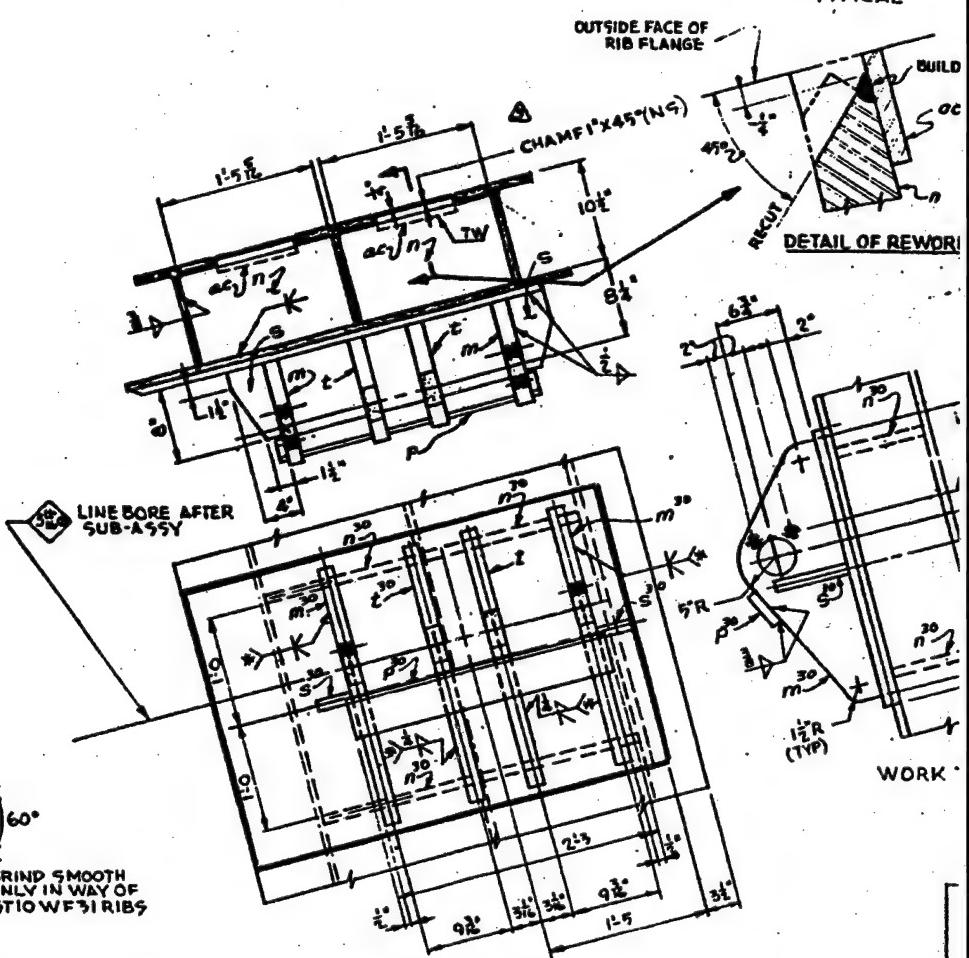
DETAIL F D
TYPICAL



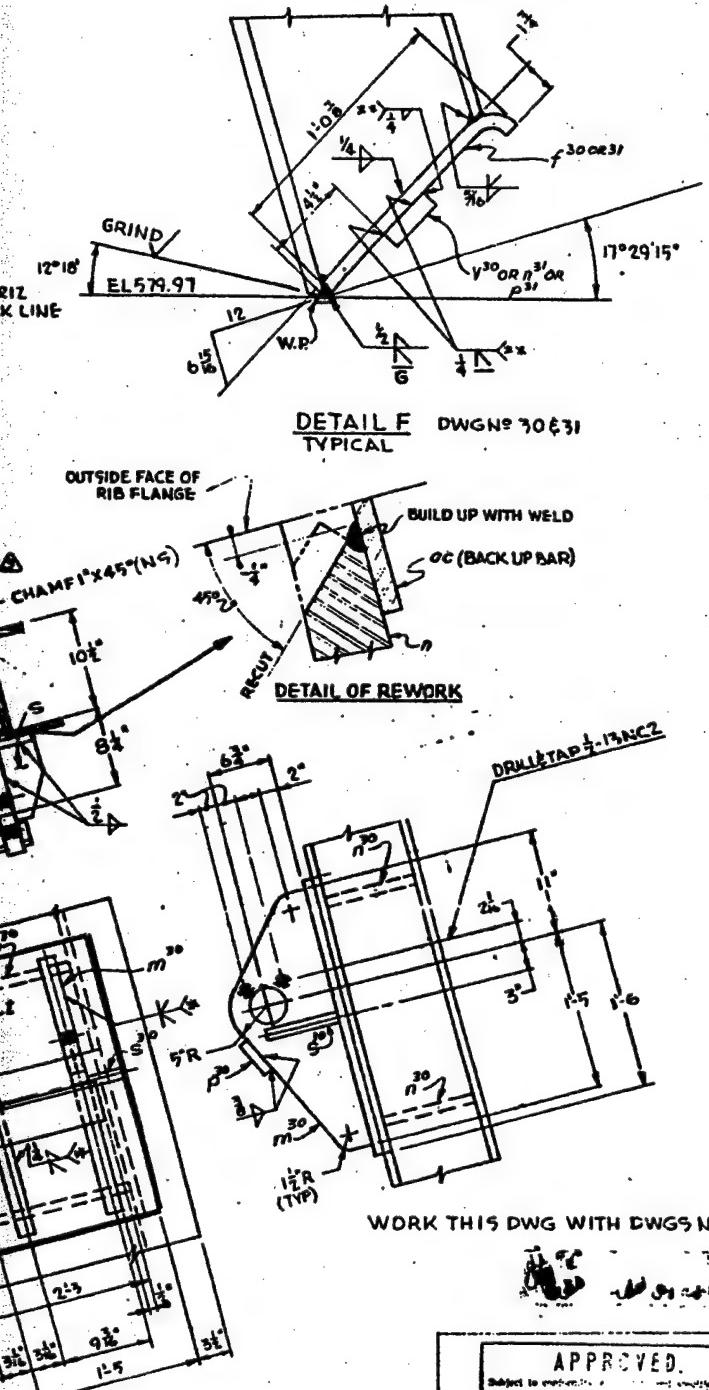
DETAIL D AS SHOWN
DETAIL D' OPP HAND
DWGS N° 30 & 31



DETAIL A DWG N° 31.



DETAIL M DWG N° 30



BILL OF MATERIAL

GRIND
12°18'
EL 579.97
LINE

**OUTSIDE FACE OF
RIB FLANGE**

DETAIL F DWG N° 30 & 31
TYPICAL

DETAIL OF REWORK

DRILL TAP 1/13 NC2

NOTE:

* THESE WELDS TO BE 100% INSPECTED BY RADIOPHOTOGRAPHY EXCEPT WHERE WELD GEOMETRY PROHIBITS ULTRASONIC TESTING MAY BE USED

**** ST. STL ELECTRODE**

REFERENCE:

CORPS OF ENGR DWG N° LGD 1-5-81 SHT 85 VOL 1 REV B

1-5-B/2	86	B
1-5-B/3	87	B
1-5-B/4	88	B

SPECS PAGE TD-16-1 SECT 16
↓ ↓ TP-9-3B PARA 9-09

WORK THIS PWG WITH PWGS № 30 E 31

DETAIL M DWG N° 30

APPROVED

ATTACHED.

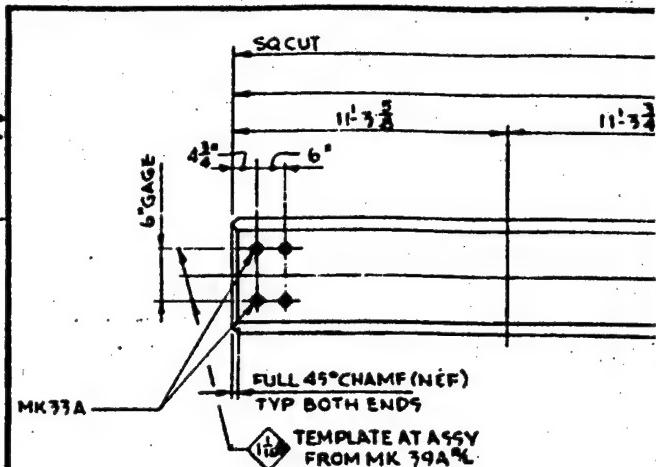
OFFICE OF THE
LITTLE CHIEF

१८-६५-५६४२-०१-००३६

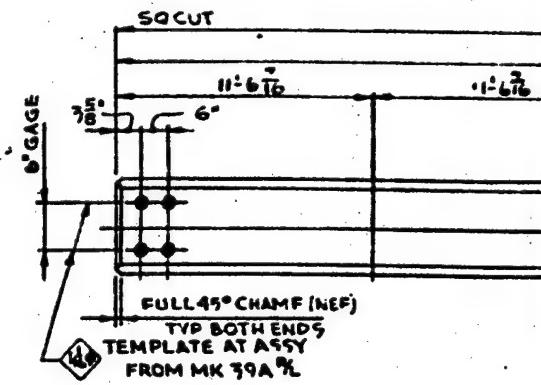
MAR 19 1980

3

ADMITTED
ALL 12 HOLE
FROM WIRE
OF MK 33A.
DDO 4 SEC.
4-19-67
CABIN

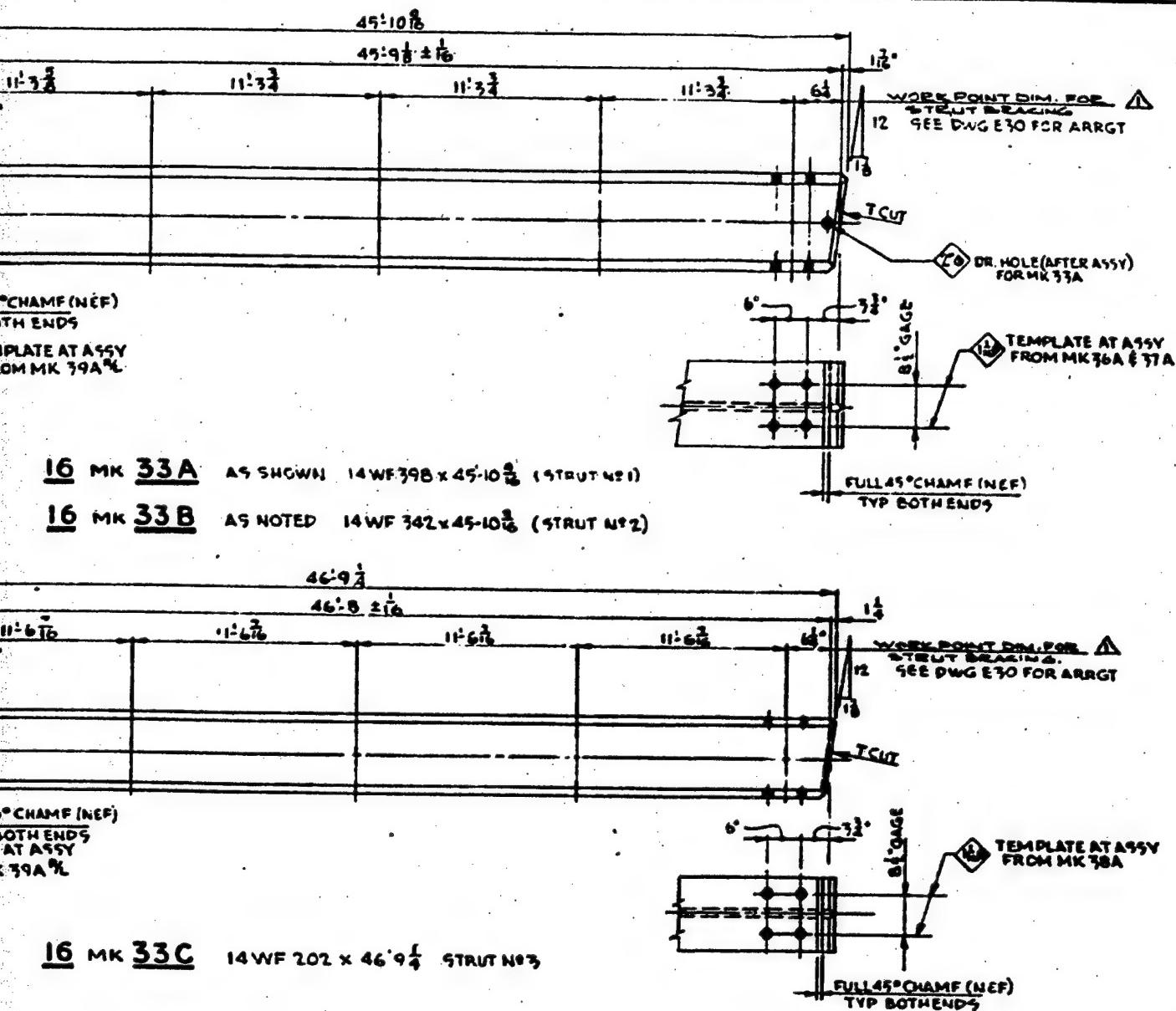


16 MK 33A AS ST
16 MK 33B AS NC



16 MK 33C 14 WI

(1)



45
CONTRACT NO.

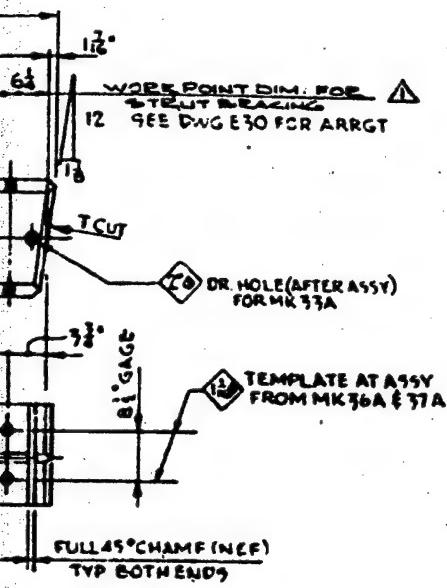
APPR

Subject to modification as
certified by owner or
of any required work. An
allowance of percent
allowing.

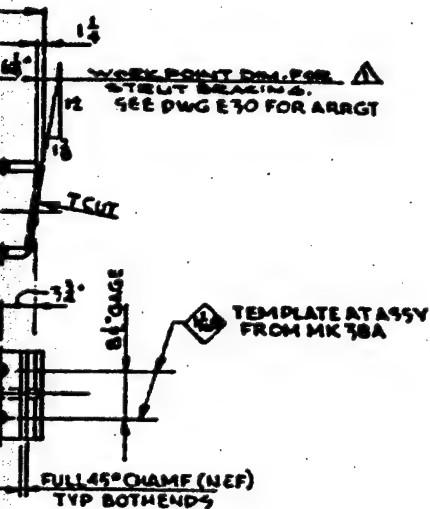
OFFICE OF THE
LITTLE GAUGE

DRAWN 6-5-

(2)



MATERIAL SPEC:
SHAPES ASTM-A36



REFERENCE

**CORPS OF ENGR DWG N° LGD-15-81 SH 85 VOL I REV B
SPEC'S: PG TP-161, SECT 16**

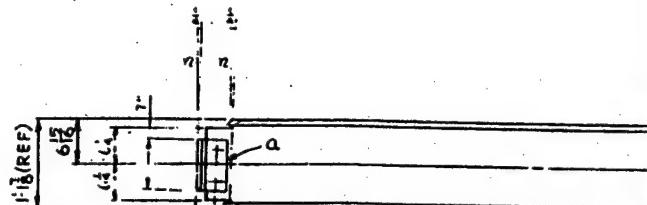
56-36030-1007

MAR 19 1980

3

REVISIONS
REVISED
TO SUIT CO 46
10-3-66 CANAL

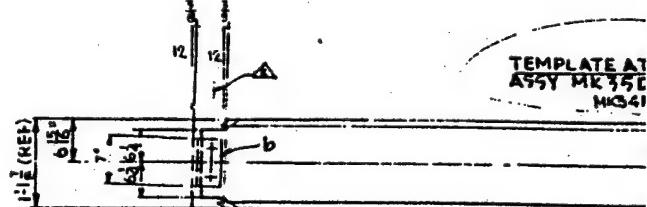
REVISED
EJECT CLIPS
FROM WELDED
TO BOLTED.
C-SHOP REC.
1-18-67 NBM
CANAL



T-CUT FULL 45° CHAMF (BOTH FLGS)

8MK 34A ^R AS SHOWN	18	WELD 10 X 16 2 ¹ / ₂	16 4 ¹ / ₂
8MK 34A ^L OPP HAND		WELD 10 X 12 9 ³ / ₁₆	12 11 ³ / ₁₆
8MK 34B ^R AS SHOWN		WELD 10 X 9 3 ³ / ₁₆	9 5 ¹³ / ₁₆
8MK 34B ^L OPP HAND		WELD 10 X 5 10 ³ / ₁₆	6 0 ¹ / ₁₆
8MK 34C ^R AS SHOWN			
8MK 34C ^L OPP HAND			
8MK 34D ^R AS SHOWN			
8MK 34D ^L OPP HAND			

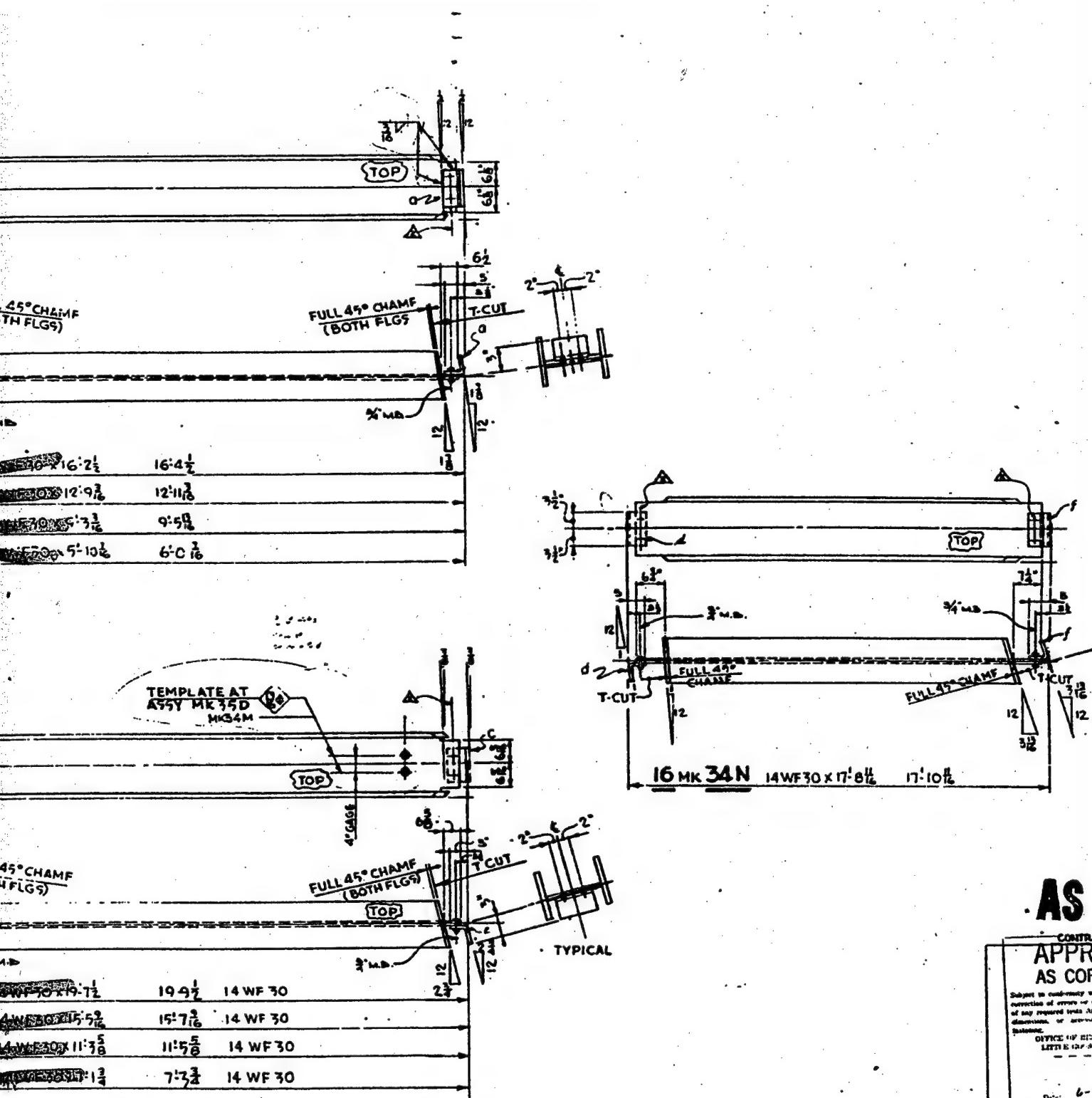
TEMPLATE AT
ASSTY MK 34E
MIGI



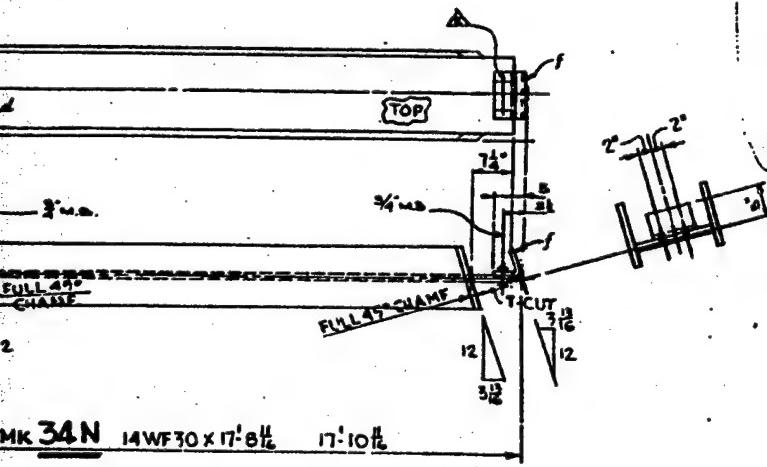
T-CUT FULL 45° CHAMF (BOTH FLGS)

8MK 34F ^R AS SHOWN	18	WELD 10 X 19 7 ¹ / ₂	19 9 ¹ / ₂ 14V
8MK 34F ^L OPP HAND		WELD 10 X 15 9 ³ / ₁₆	15 7 ³ / ₁₆ 14V
8MK 34H ^R AS SHOWN		WELD 10 X 11 3 ⁵ / ₁₆	11 5 ¹³ / ₁₆ 14V
8MK 34H ^L OPP HAND		WELD 10 X 11 3 ⁵ / ₁₆	11 5 ¹³ / ₁₆ 14V
8MK 34K ^R AS SHOWN			
8MK 34K ^L OPP HAND			
8MK 34M ^R AS SHOWN			
8MK 34M ^L OPP HAND			

(1)



(2)



MK 34N 14WF30 x 17'-8 1/4 17'-10 1/2

AS BUILT

CONTRACT NO. DAAP-164 CIVENG65-500

APPROVED
AS CORRECTED

Subject to audit-ready with plans and specifications, correction of errors or omissions, and to fulfillment of any required tests. Approval does not cover details, dimensions, or accessibility for assembling or installing.

OFFICE OF DIRECTOR ENGINEER
LITTLE GOOSE LOCK AND DAM

1000

6-5-67

BILL OF MATERIAL

			QTY	DESCRIPTION	WEIGHT
8	34A ^b 16	a	14WF30	16 2 1/2 (T)	548721.1791
8	34A ^b 32	a	R 7 x 1/4	0 7/8 BEND	125
8	34B ^b 16	a	14WF30	12 0 3/4 (T)	548721.1966
8	34B ^b 32	a	R 7 x 1/4	0 7/8 BEND	125
8	34C ^b 16	a	14WF30	0 3 3/4 (T)	548721.4156
8	34C ^b 32	a	R 7 x 1/4	0 7/8 BEND	125
					3515
8	34D ^b 16	a	14WF30	5 10 6 (T)	548721.2313
8	34D ^b 32	a	R 7 x 1/4	0 7/8 BEND	125
					2443
8	34E ^b 16	a	14WF30	19 7 1/2 (T)	548721.7422
8	34F ^b 16	b	R 7 x 1/4	0 7/8 BEND	62
16	C	R 7 x 1/4	0 7/8 BEND	62	
					9546
8	34H ^b 16	a	14WF30	15 5 1/2 (T)	548721.2421
8	34H ^b 16	b	R 7 x 1/4	0 7/8 BEND	62
16	C	R 7 x 1/4	0 7/8 BEND	62	
					7545
8	34K ^b 16	a	14WF30	11 3 1/2 (T)	548721.5424
8	34K ^b 16	b	R 7 x 1/4	0 7/8 BEND	62
16	C	R 7 x 1/4	0 7/8 BEND	62	
					5548
8	34M ^b 16	a	14WF30	7 1 1/4 (T)	548721.3432
8	34M ^b 16	b	R 7 x 1/4	0 7/8 BEND	62
16	C	R 7 x 1/4	0 7/8 BEND	62	
					1534
16	34N	a	14WF30	11 3 3/4 (T)	548721.5510
16	d	R 7 x 1/4	0 7/8 BEND	62	
16	f	R 7 x 1/4	0 7/8 BEND	62	
					8634
				TOTAL	56509
			576		

MATERIAL SPEC:
R & SHAPES ASTM-A36

REFERENCE

CORPS OF ENGR DWGN# LGD1-5-B/1 SHT 85 VOL3 REV B
SPEC'S: PAGE TR-16-1, SECT 16

Notched Butts	REQD	CORPS OF ENGR
SPLATO	OPEN HEEL	13/16" except as noted
END AND EDGE DISTANCE		except as noted
SPACING NOT SHOWN		
PAINT	NO SHOP PAINT	
 PACIFIC CAR AND FOUNDRY COMPANY 60 E. HUDSON ST. PA 3-2200 SEATTLE, WASHINGTON 98104		
LITTLE GOOSE LOCK & DAM ITEM 101 SPILLWAY GATE VINNELL, MANNIX, RULER, DILLINGHAM CAHILL DATE 5/16/66 CNTL 240 DATE 5-16-66 ISSUED STRUT BRACING DETAILS C67011101 - 2 MILE 1/2 FEET APPROVED 1 MILE 500 ft K.L. Kinsman 34- 300 ft APPROVED 300 ft APPROVED 300 ft APPROVED 300 ft APPROVED		

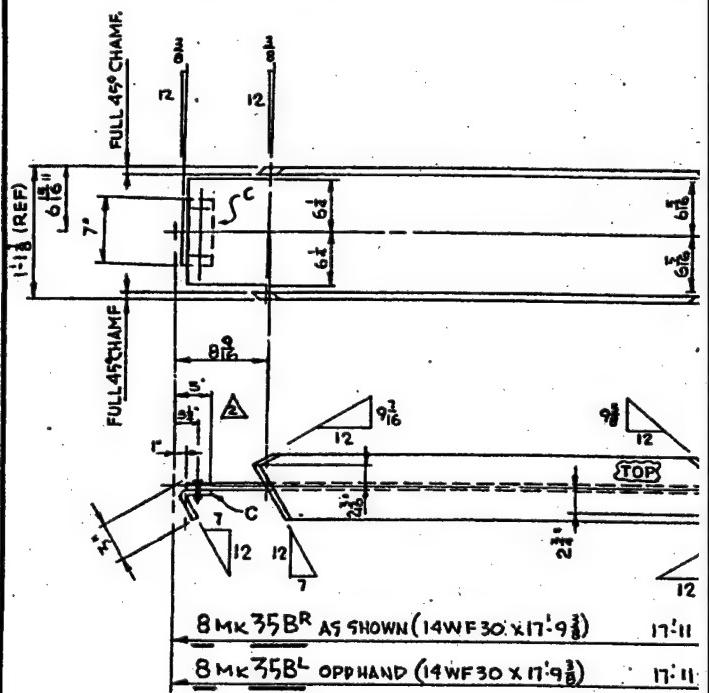
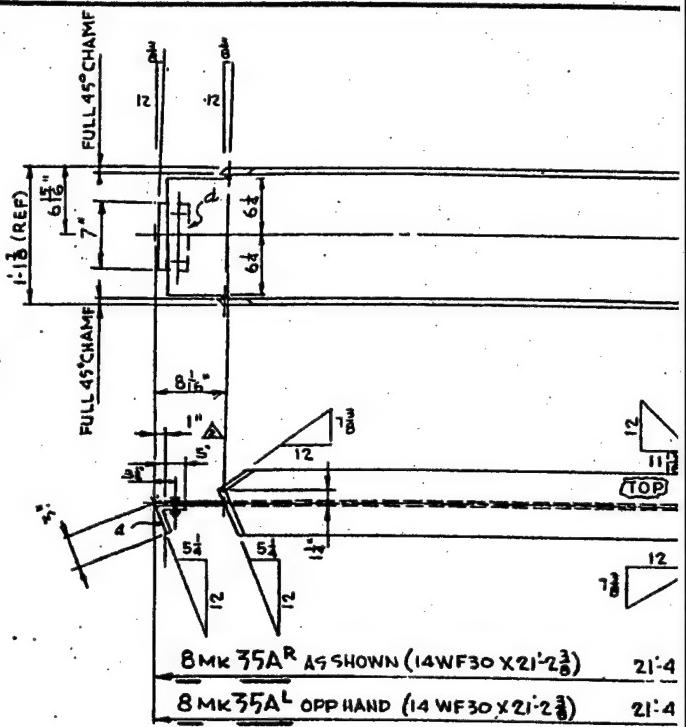
517-65-560-101-008 389

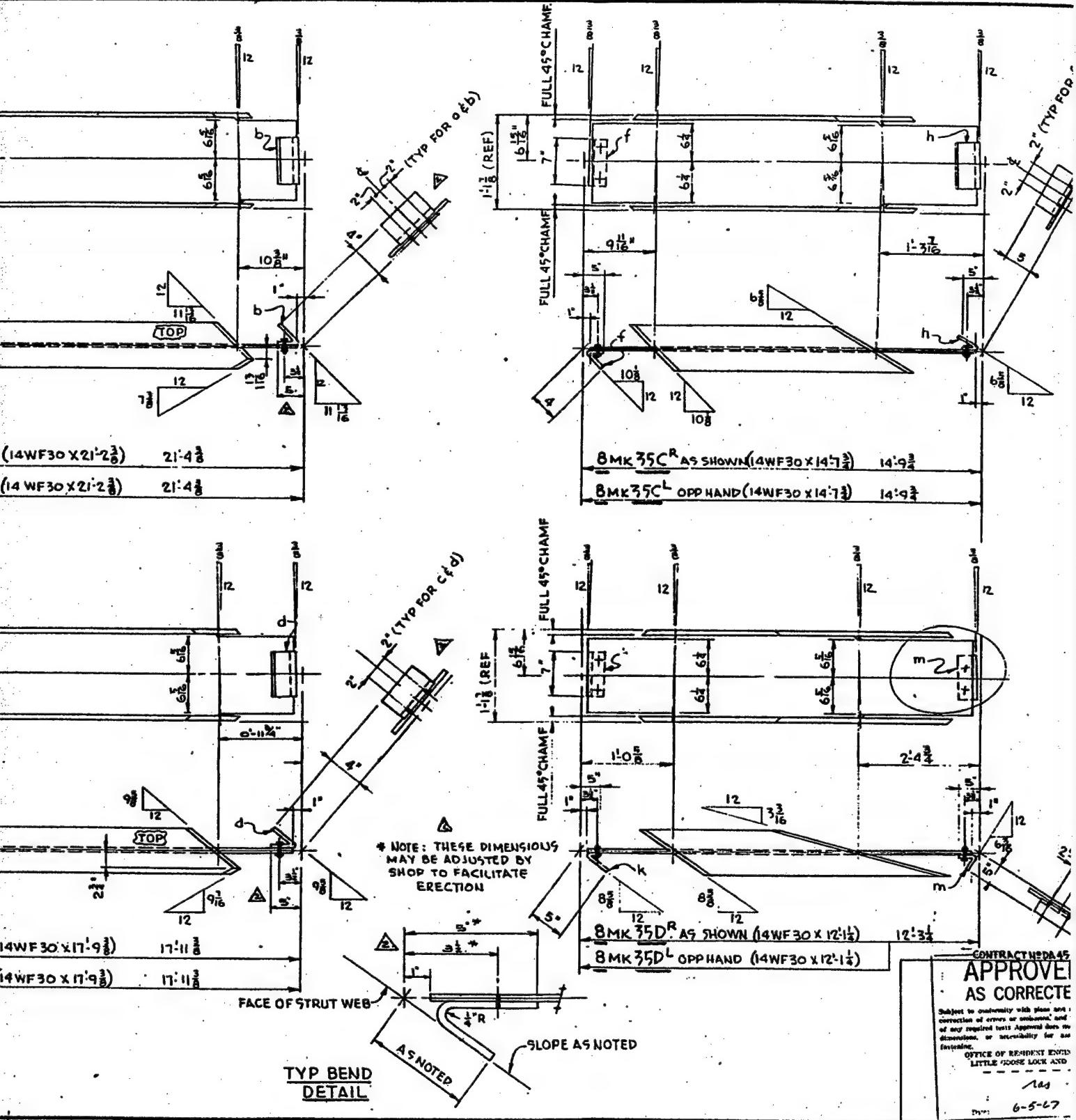
MAR 19 1980

3

REVISIONS
REVISED TO
SUIT CO H-46
10-3-66 CAHILL
DW

REVISED
ERECT CLIPS
FROM WELDED
TO BOLTED
@ SHOP REQ.
4-19-67. H-300
CAHILL



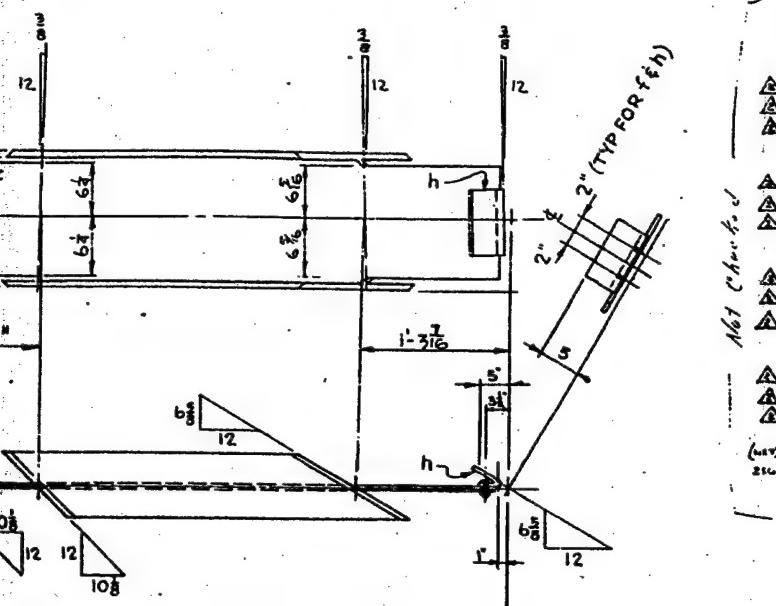


CONTRACT NO DA-45
APPROVE
AS CORRECT

Subject to consistency with plan and correction of errors or omissions, and of any required tests. Approval does not dimensions, or accessibility for use fastening.

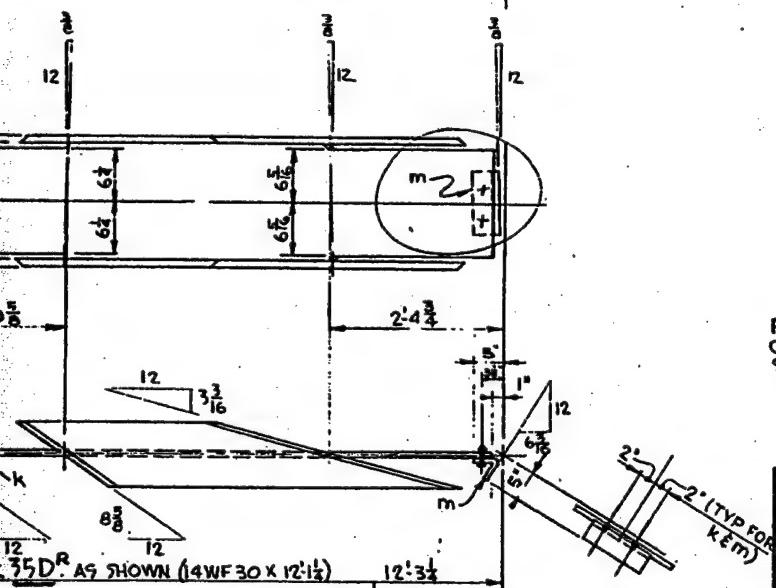
OFFICE OF REGIMENT ENTH
'LITTLE GOOSE LOG AND
— — — — —

ras



35C R AS SHOWN (14WF30 X 14-7/8) 14' 9 3/4

35C L OPP HAND (14WF30 X 14-7/8) 14' 9 3/4



35D L OPP HAND (14WF30 X 12-1/2)

CONTRACT DA-45-164-CIVENG-65-560

**APPROVED
AS CORRECTED**

Subject to conformance with plans and specifications.
Correction of errors or omissions, and to fulfillment
of any required tests. Approval does not cover detail
dimensions or acceptability for assembling and
fastening.

OFFICE OF READING ENGINEER
LITTLE GOOSE LOCK AND DAM

6-5-67

BILL OF MATERIAL					
ITEM	DESCRIPTION	SIZE	LENGTH	REMARKS	WEIGHT
8 35A 16	WELD. 16" X 1 1/4"	12' 2 1/2" 30 ft	21 236	54812	16176
8 35A 16 a	R. 7 x 1/4	10 7			57
8 35A 16 b	R. 7 x 1/4	10 7			57
8 35B 16	WELD. 16" X 1 1/4"	17 5 1/2" 30 ft	17 5 1/2	54874	10290
8 35B 16 c	R. 7 x 1/4	0 17			56
8 35B 16 d	R. 7 x 1/4	0 17			56
8 35C 16	WELD. 16" X 1 1/4"	14 1/2" 30 ft	14 1/2	54872	8642
8 35C 16 f	R. 7 x 1/4	0 78			61
8 35C 16 h	R. 7 x 1/4	0 8			66
8 35D 16	WELD. 16" X 1 1/4"	12 1/4" 30 ft	12 1/4	54873	7159
8 35D 16 k	R. 7 x 1/4	0 8			67
8 35D 16 m	R. 7 x 1/4	0 8			66
					5940
(REV)					TOTAL 32,031
2601					2412
					5% M.B.
					0 14

MATERIAL SPEC
PLATE & SHAPE ASTM-A36

REFERENCE
CORPS OF ENGR DWG NO LGD1-5-B/1 SHT 85 VOL I REV B
SPEC'S PAGE TP-16-1, SECT 16

AS BUILT

NOT FILLED OUT	REQD	CORPS OF ENGR
NOT FILLED OUT	1 3/16	EXCEPT AS NOTED
NOT FILLED OUT	SPRING WELDS	EXCEPT AS NOTED
NOT FILLED OUT	END AND EDGE DISTANCE	EXCEPT AS NOTED
NOT FILLED OUT	SPACING NOT SHOWN	
NOT FILLED OUT	PATIN	NO SHOP PAINT
PACIFIC CAR AND FOUNDRY COMPANY		
60 E. HUDDLE ST. PAL 2-5200		
SEATTLE, WASHINGTON 98134		
LITTLE GOOSE LOCK EDAM		
ITEM 101 - SPILLWAY GATE		
VINNELL, MANLIX, FULLER, PILLINGHAM		
CAHILL DATE 7/165 CMC 600 DATE 5-14-66		
SUBCONTRACTOR		
STRUT BRACING DETAILS C670-11101		
605-560-101-009 390		

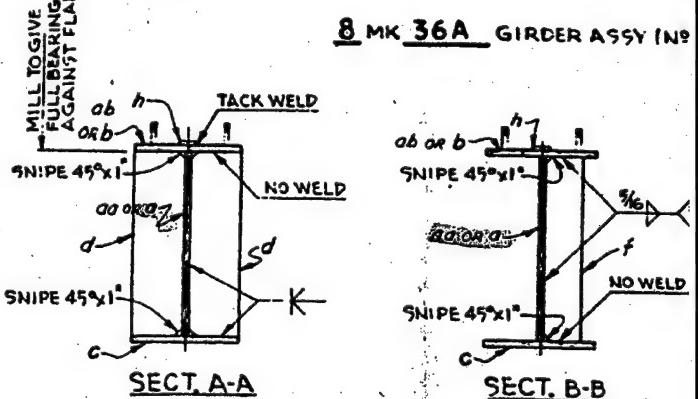
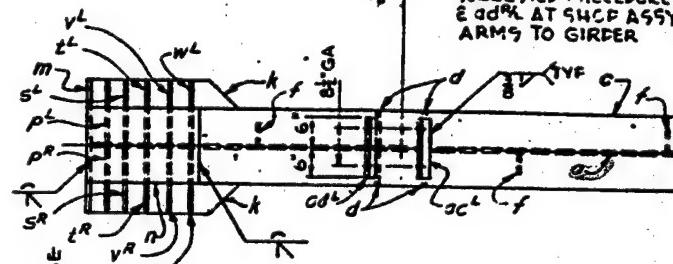
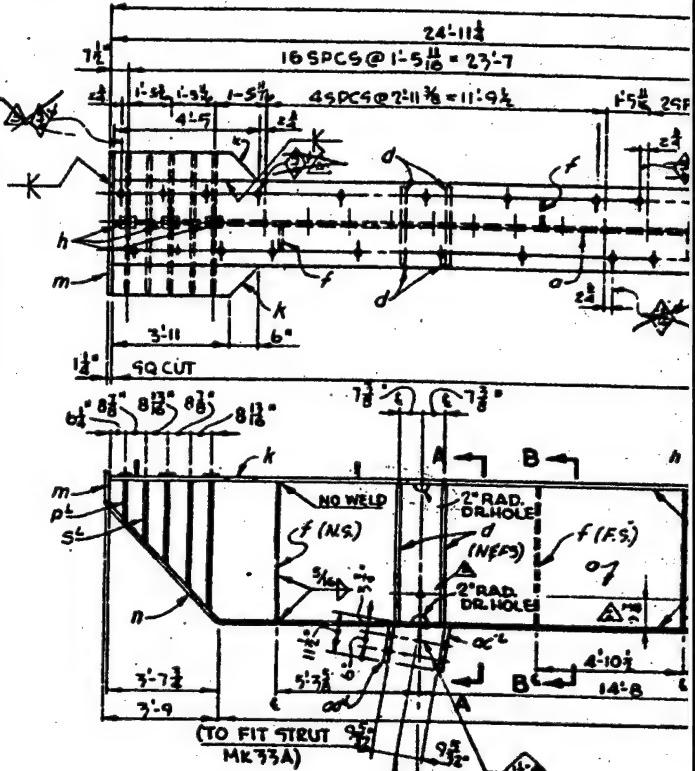
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MAR 19 1980

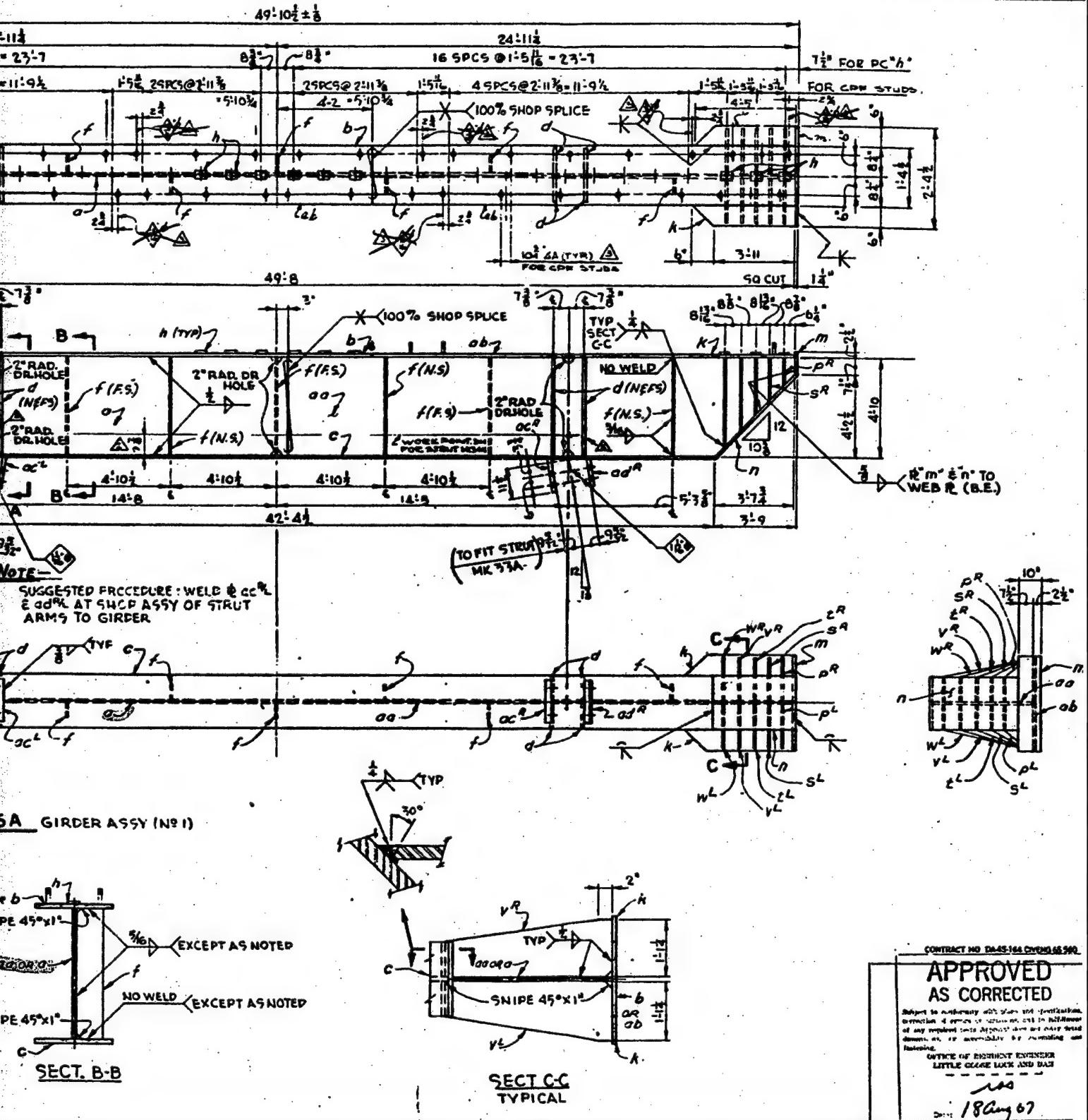
REVISED
ERCTION
DET TO SUIT
10-3-66
CABIN CW

~~▲ DELETED~~
1/2 DIA. HOLES
FROM WELD
OF GIRDERS.
C/SHP REQ.
4-19-67 A. DOB
CABIN

~~▲ DELETED~~
SCHP STUDS
ADDED BECAUSE
1/2 DIA. HOLES
TO SUIT.
Weld Base
Cabin



(1)



CONTRACT NO DA43-164 CIVEXI 68-540

~~APPROVED
AS CORRECTED~~

Subject to authority will show and specifications
specification of services or equipment, set in fullness
of any required time against time and every third
dimension, as is reasonable by consulting and
discussing.

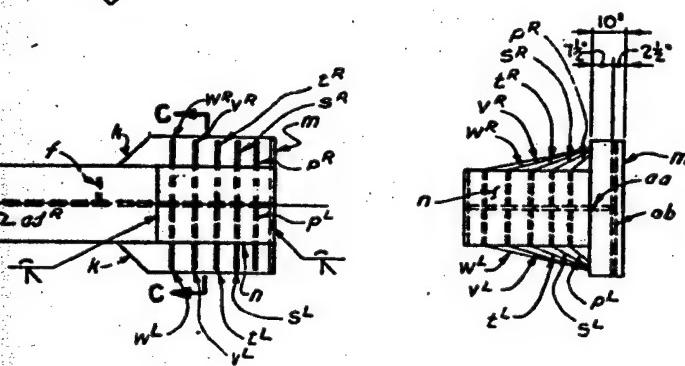
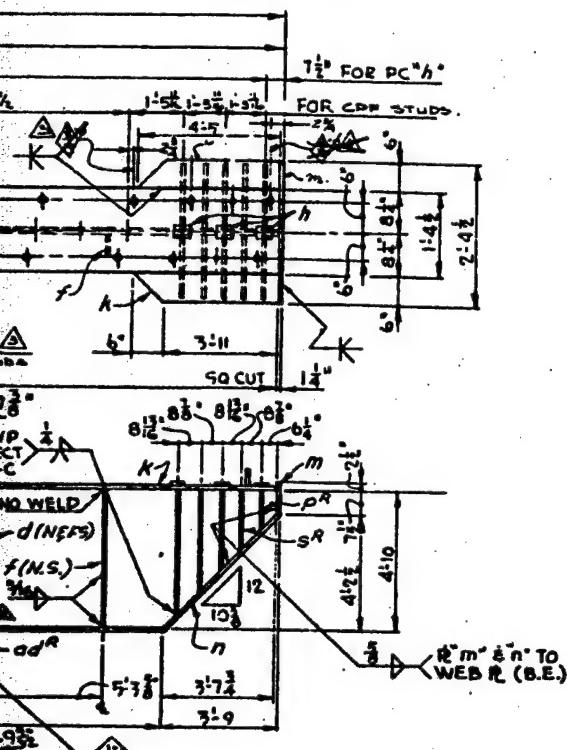
OUTLINE OF EXPERIMENT ENVIRONMENT

LITTLE CLOTH WORK AND DAZZ

100

IBC 12

2011-18 Ling 61



CONTRACT NO. DA-43-164-CV-MO 65-560

**APPROVED
AS CORRECTED**

Subject to availability with short lead times for delivery, correction of errors or omissions, and in fulfillment of any required tests, the contractor may treat damage as, or as ascertainable by examining and measuring.

OFFICE OF RECENT ENVIRONMENT

LITTLE GAME LAW AND L.L.C.

100

• 180 • 17

Page 67

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• •

MATERIAL SPEC: PLATE & BAR ASTM-A76 EXCEPT AS NOTED
PLATE LOW ALLOY STL - SEE PAGE TP-9-38,
PARA 9-09 OF GEN. SPEC.
MACH BOLTS ASTM A307 GRA
WELD STUDS MFRG QTD

REFERENCE:
CORPS OF ENGR DWG N° LGD1-5-8/2 SHT 86 VOL I REV 6
1-5-8/3 1 87 1 8
SPEC. PAGE TP-16-1, SECT 16
TP-9-38, PARA 9-09

Hot Fluid Pipe	CONT. WELDING	PROTECTION		
	REVIEWED SOLVER	OPEN HOLES	1 1/16"	EXCEPT AS NOTED
H&R	END AND EDGE DISTANCE			EXCEPT AS NOTED
	SPACING NOT CRITICAL			
H&R	PATENT	NO SHOP PAINT		
PACIFIC CAR AND FOUNDRY COMPANY 60 S. HUDDLE ST. PA. 5-2356 SEATTLE, WASHINGTON 98134				
LITTLE GOOSE LOCK E DAM ITEM 101 - SPILL WAY GATE VINNELL, MANNIX, FULLER, DILLINGHAM, CAHILL				
DRAWN BY: [Signature] DATE 5-10-66				
REVISED				
GIRDERS NO 1 C670-12101				
CROSS SECTION				
S.S. & S.P.L.				
P.M. 100% APPROVED				
F.M. 100% APPROVED				
C.H.C.C. 100% APPROVED				
I.G. 100% APPROVED				
T. LINDGREN				
36-3				

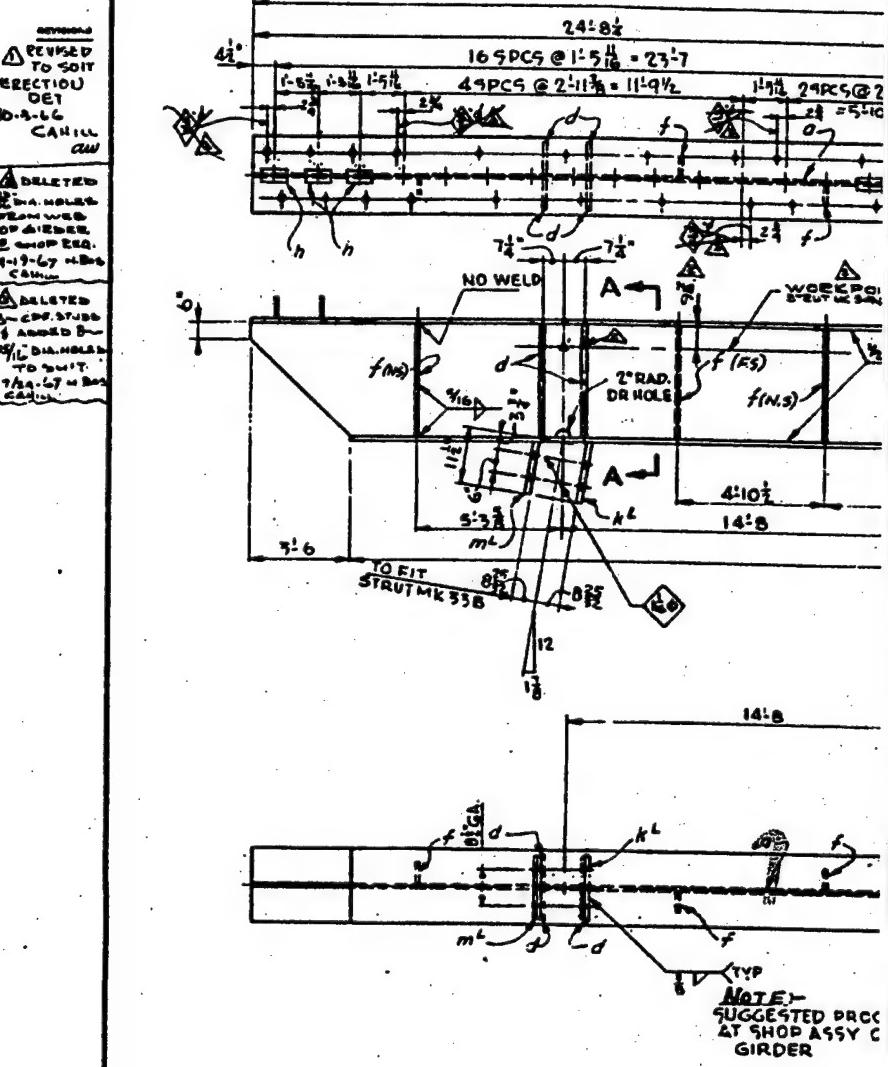
46-55-560-101-010 39

MAR 19 1980

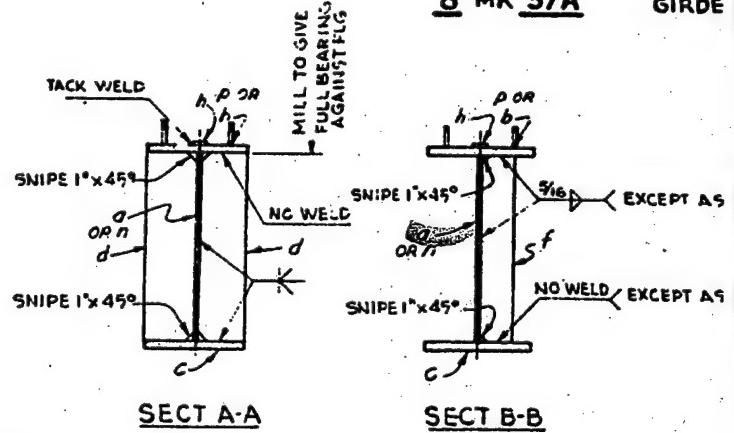
APPROVED
REVISED
TO SOIT
ECTION
DET
10-9-66
CANILL
aw

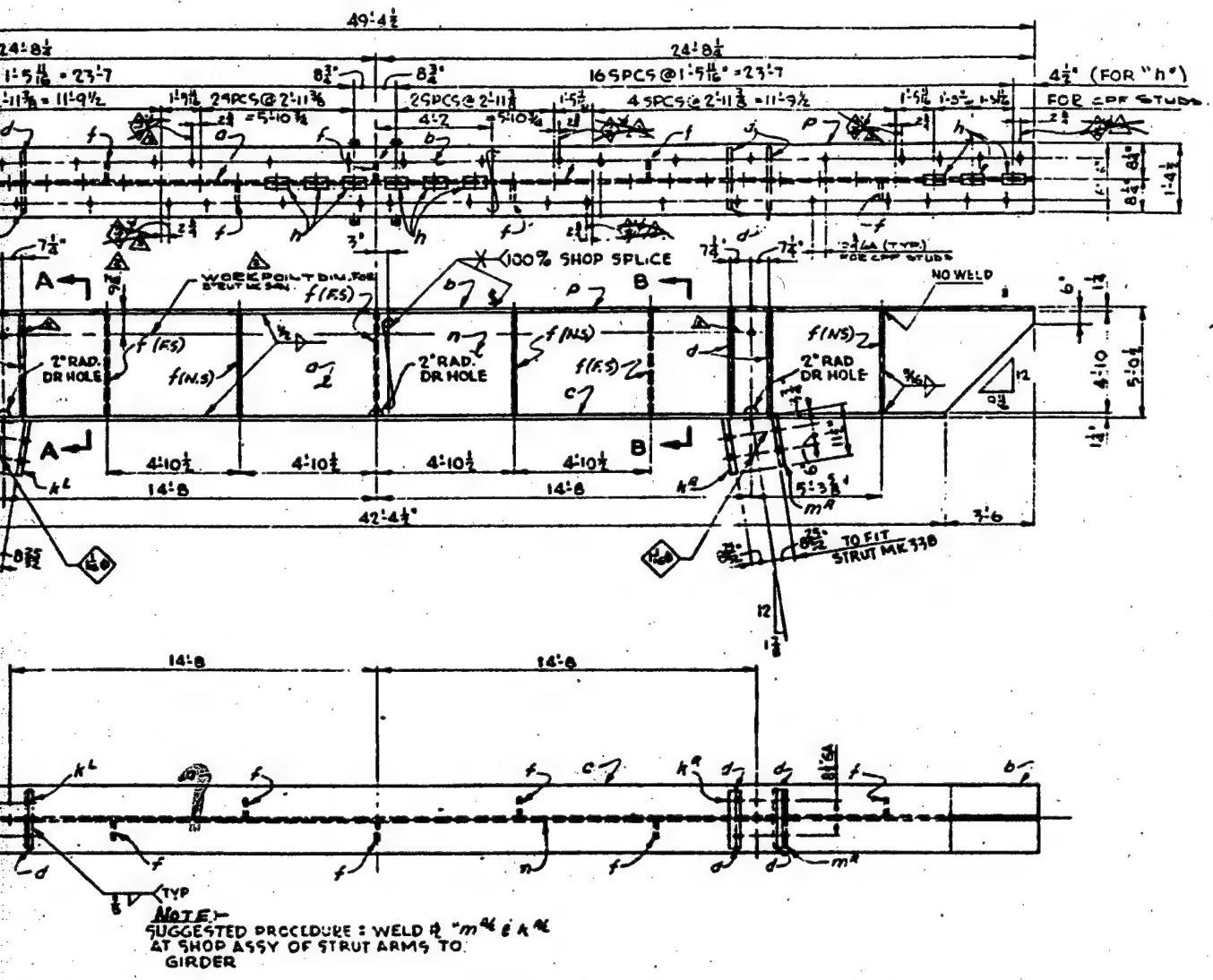
~~DELETED~~
Holes
Punches
or
Screws
Shop Req.
4-19-67 Holes
Cylindrical

~~DELETED~~
G.C.D. STUDS
ARMED
W/BLIND
TO SPLIT
P.H.L. 1/2" W/200
GRANITE

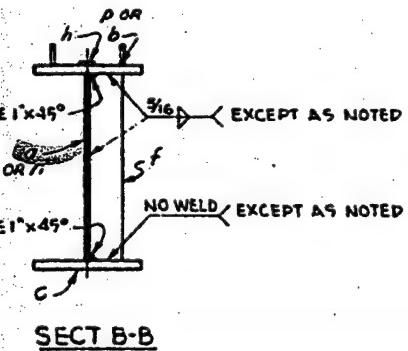


8 MK 37A GIRDER





8 MK 37A GIRDER ASSY (N°2)



CONTRACT NO CA-45-164 CIVENG 1

**APPROVED
AS CORRECTED**

Subject to modification with plans and specifications of exterior or interior walls to furnish all required tests. Approved drawings for dimensions, or as necessary for as existing building.

OFFICE OF RESIDENT ENGINEER
LITTLE CREEK LOCK AND DAM

— 1 —

189

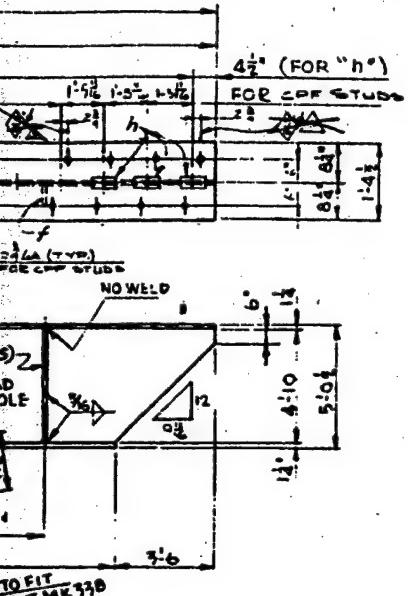
Date: 18 Aug 67

— 1 —

— 1 —

100

10.000-15.000 m²



REFERENCE:
CORPS OF ENGRS DWG N^o LGD 1-5-B/2 SHT B6 VOL I REV B
1 1-5-B/3 87 1 B
SPECS PAGE TP-16-1, SECT 16
1 PAGE TP-9-3B, PARA. 9-00

AS BUILT

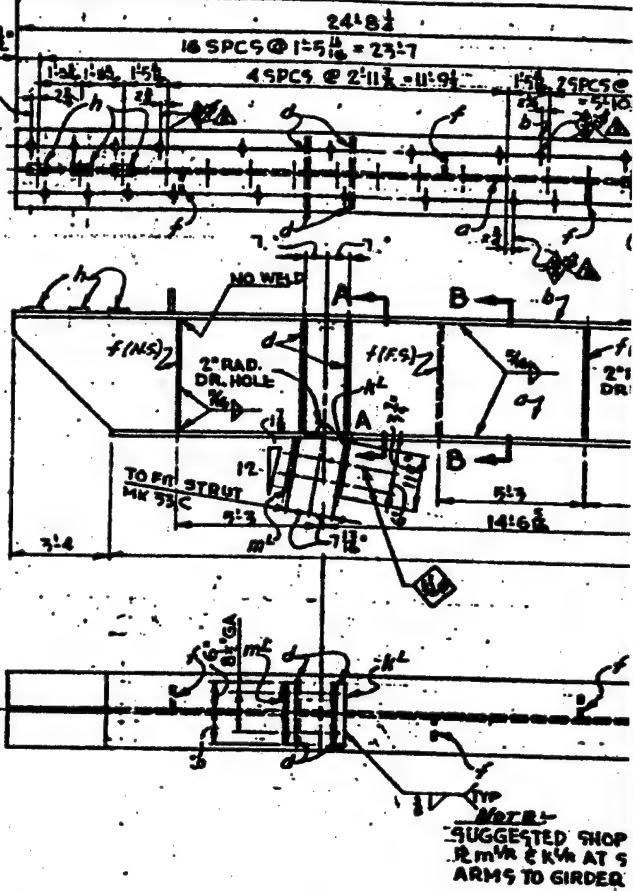
LIG:65-560-101-011 392

3

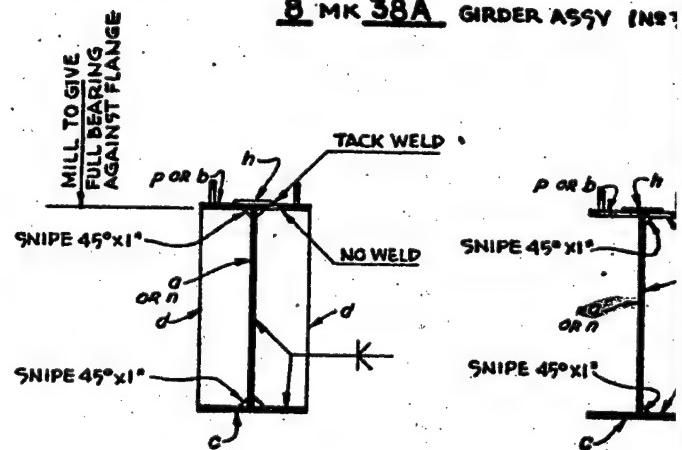
MAR 19 1980

REVISED
SECTION
DETAIL TO
SHEET 691
10+66 CANTILEVER
CANT

DELETED -
P- OFF OTHER
ADDED B-
HOLE, HOLE
TO SHFT.
VALVE IN BODY
CANTILEVER

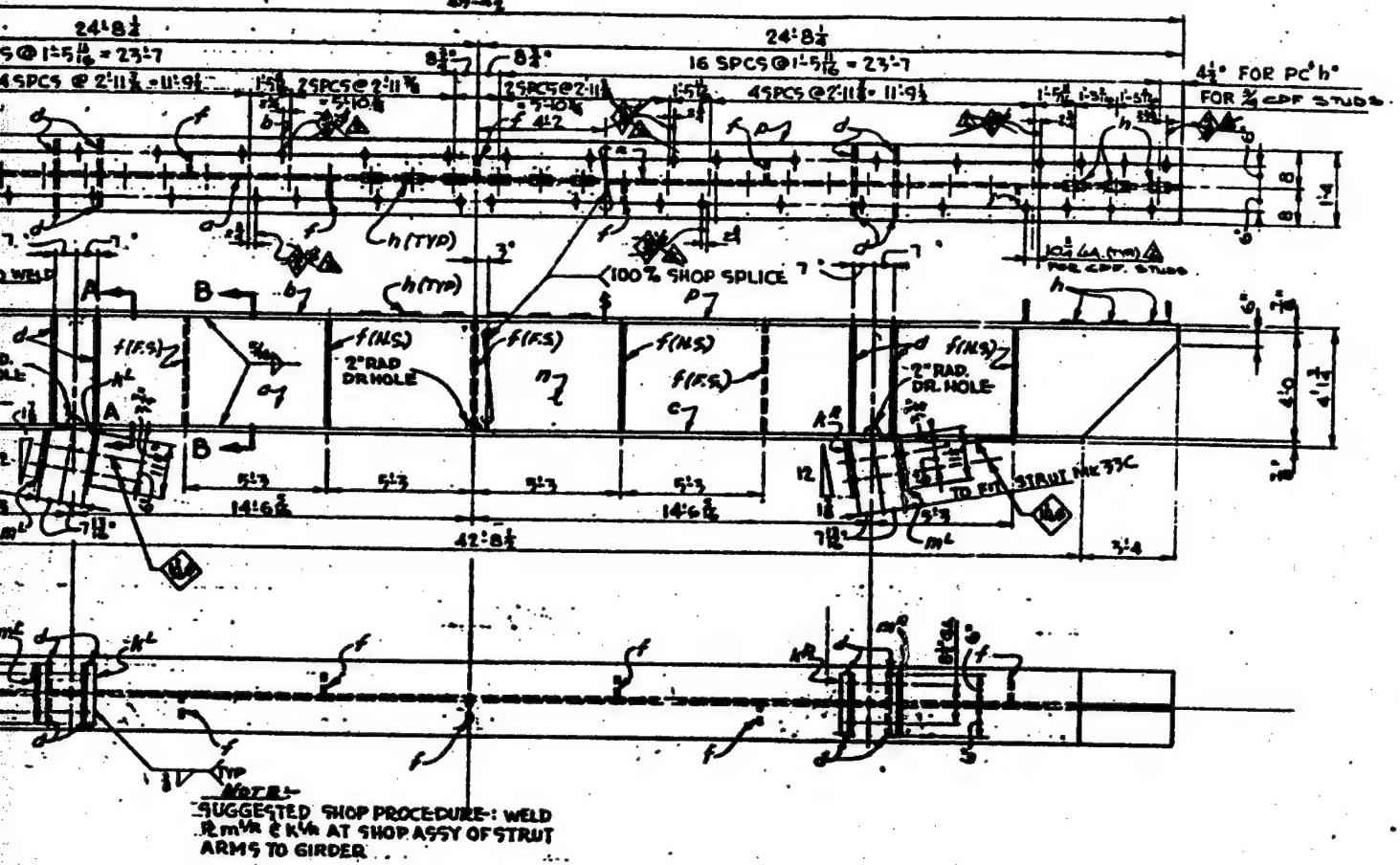


8 MK 38A GIRDER ASSY (IN 2)

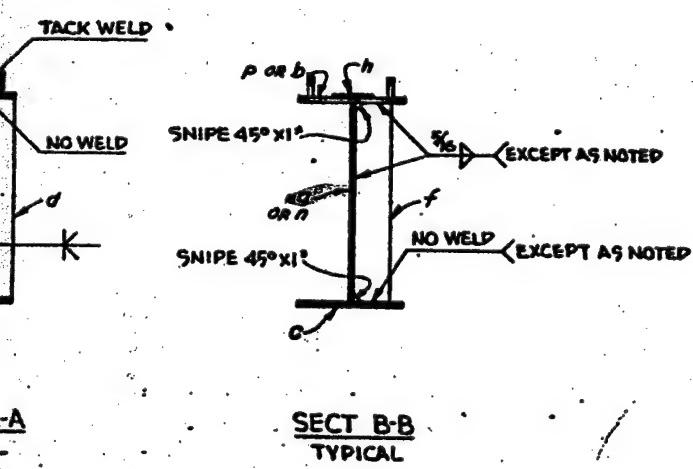


SECT A-A
TYPICAL

SECT B
TYPICAL



MK 38A GIRDER ASSY (N23)



CONTRACT NO. DA-49-1
APPROV'D AS CORRECT

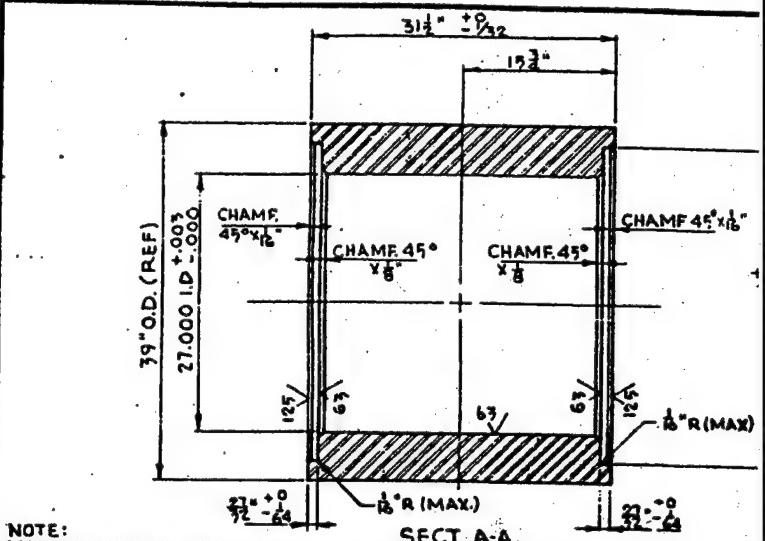
Subject to conformity with plans & specifications or drawings, or any requirements, or any other conditions, or instructions, or requirements for acceptance.

OFFICE OF INSPECTOR TO
LITTLE CREEK LOCK IN

17G

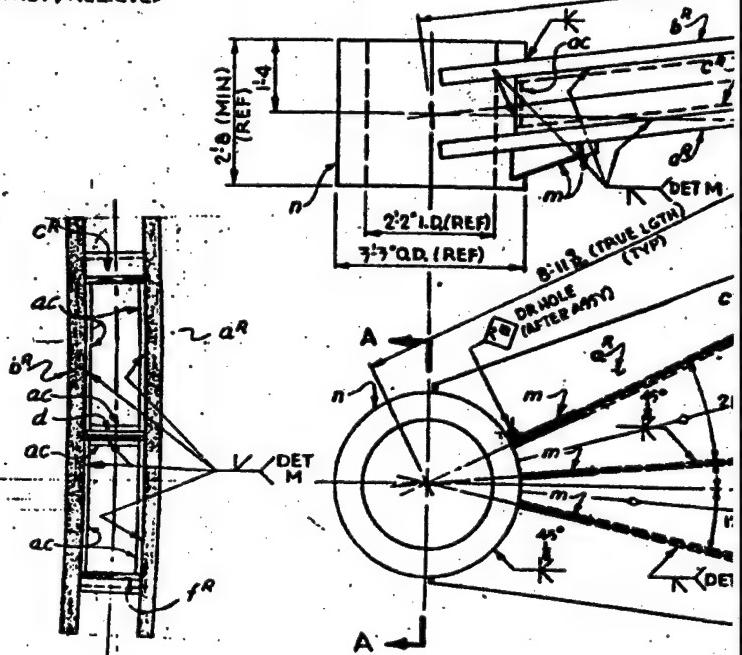
REVISED
TO SUIT
C.O. 4949
10-3-66
CAHILL
dwg

REVISED
WELD DET. M
TO SUIT COFE
DESIGN DWG
JS. 10/6/67
CAH



NOTE:
MACHINING TO BE COMPLETED
AFTER WELDMENT HAS BEEN
STRESS RELIEVED

SECT A-A
MACHINING DETAIL

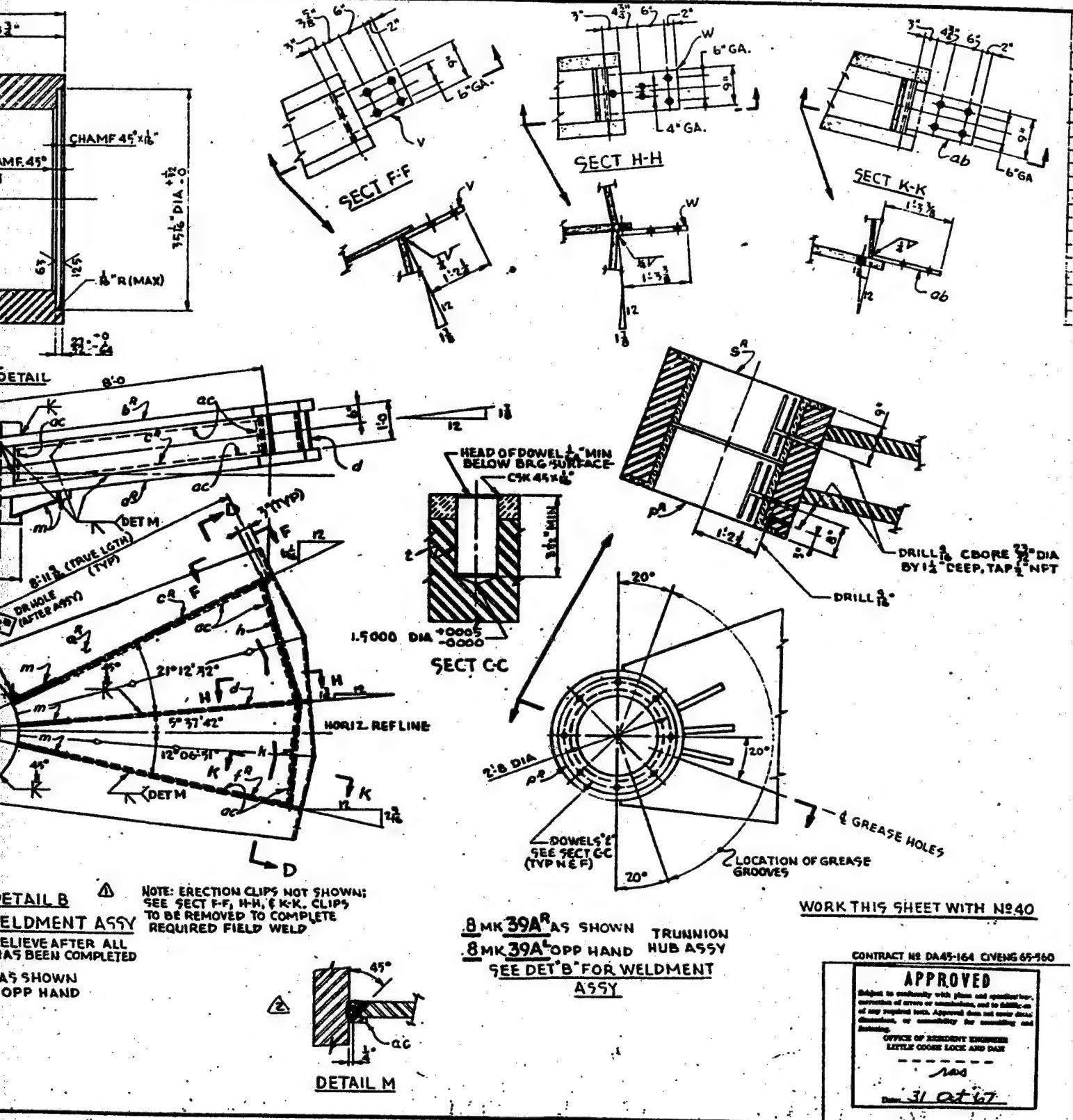


SECT D-D

DETAIL B
WELDMENT ARTY
STRESS RELIEVE AFTER ALL
WELDING HAS BEEN COMPLETED

AS SHOWN
OPP HAND

NOTE
SEE
TO E
REI



DETAL B 4
ELDMENT ASSY
BELIEVE AFTER ALL
HAS BEEN COMPLETED

**NOTE: ERECTION CLIPS NOT SHOWN;
SEE SECT F-F, H-H, & K-K. CLIPS
TO BE REMOVED TO COMPLETE
REQUIRED FIELD WELD.**

BELIEVE AFTER ALL
HAS BEEN COMPLETED
AS SHOWN
ON P. 111

DETAIL M

8 MK 39A^R AS SHOWN TRUNNION
8 MK 39A^L OPP HAND HUB ASSY
SEE DET 'B' FOR WELDMENT
ASSY

WORK THIS SHEET WITH No 40

CONTRACT NO DA45-164 CIVENG 65-560

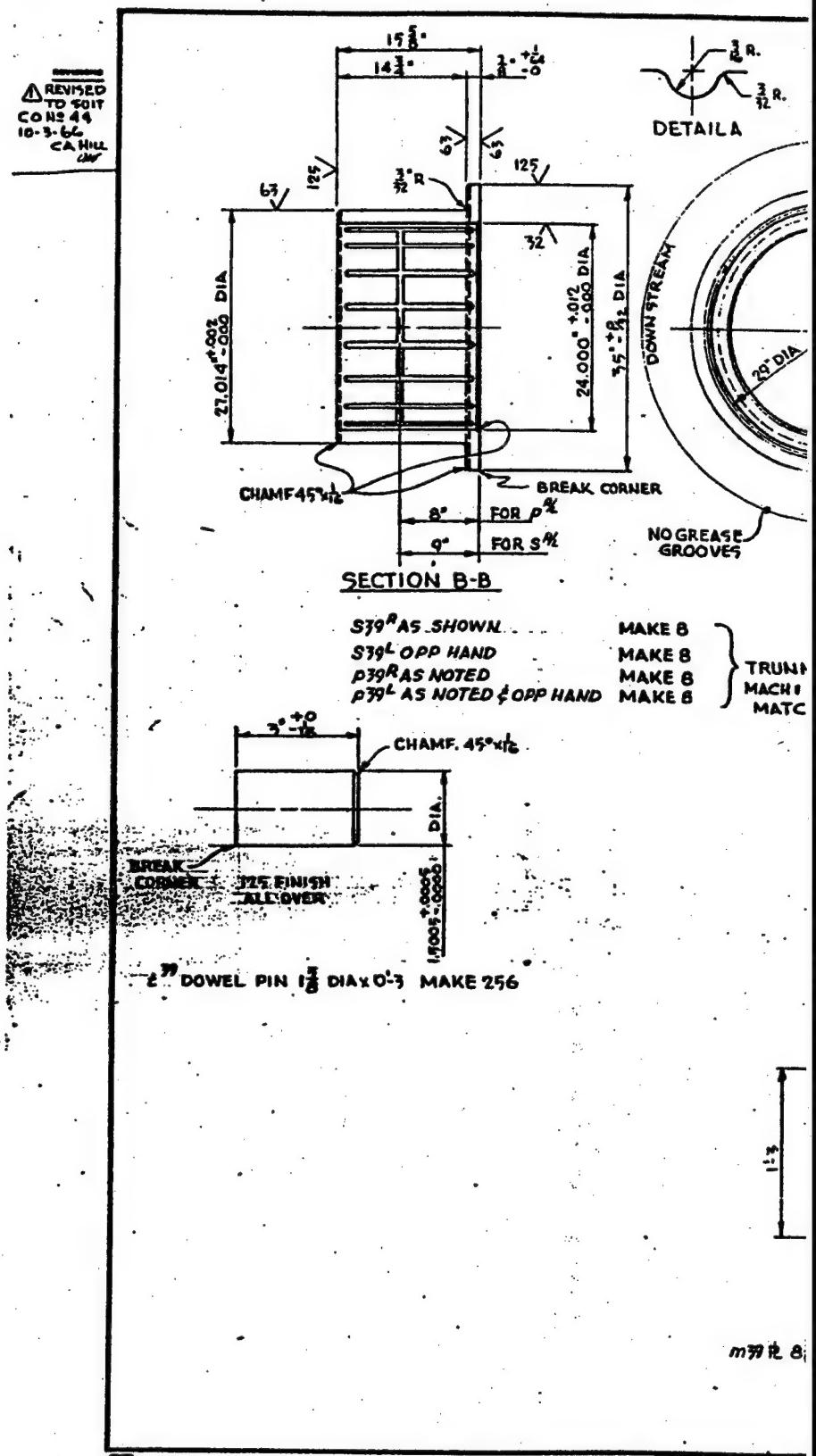
APPROVED
Subject to confirmation with plans and specifications
of errors or omissions, and to finalization
of any required tests. Approved does not cover details
of construction, or methodology for controlling and
monitoring.

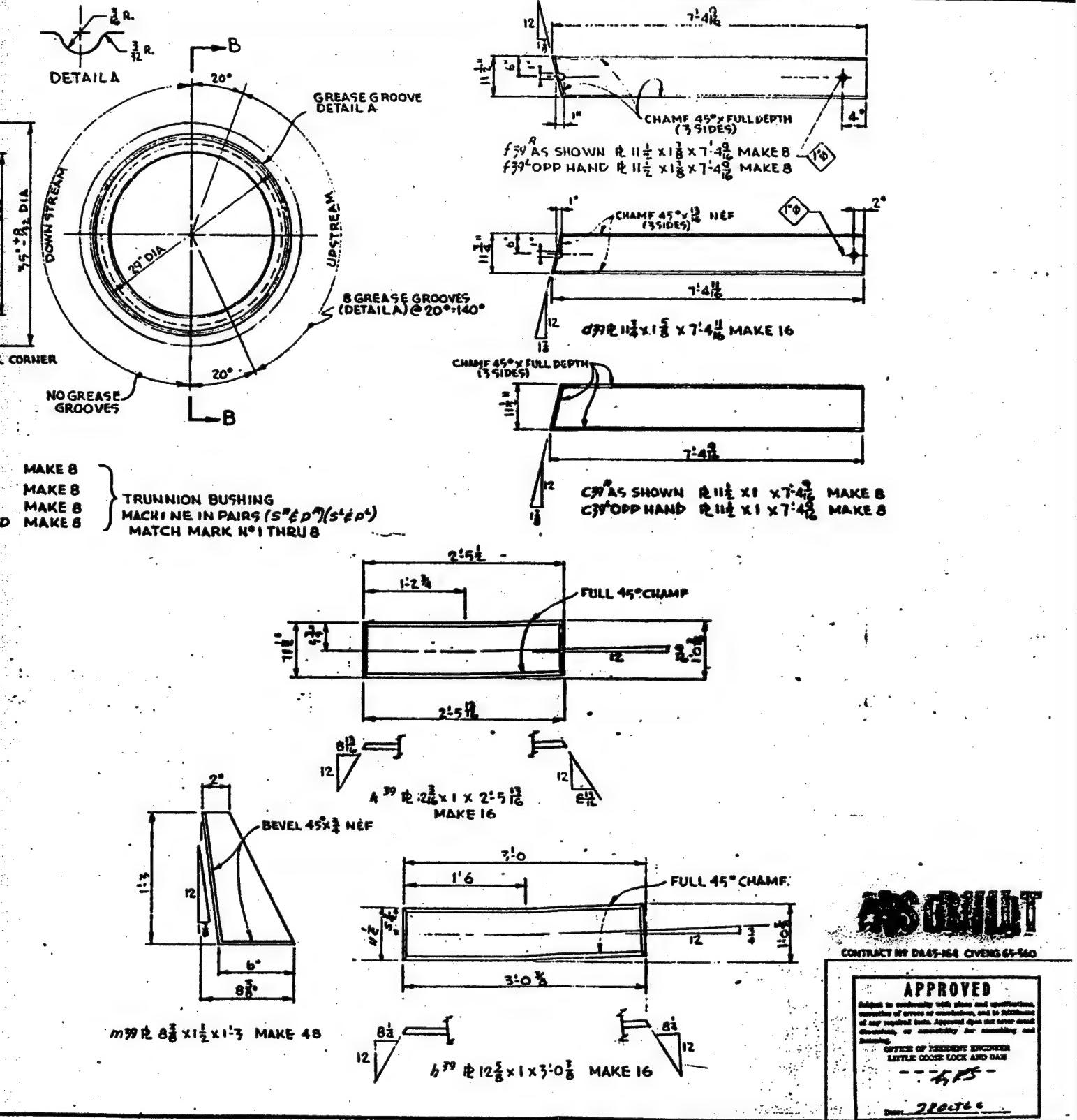
DET DWG N 40

BILL OF MATERIAL						
DET DWG N 40	ITEM	QUANTITY	DESCRIPTION	UNIT	AMOUNT	WEIGHT
40A	8 39A ^R	16	4 1/2" R 600x3 1/2	lb	9 076	143.98L
40A	8 39A ^L	16	b/R R 600x3 1/2	lb	8 104	128.50L
40	16 CYR R 11 1/2 X 1	7	4 1/2" X 1	lb	7 473	5.723
40	16 D 1/2" R 11 1/2 X 1	7	4 1/2" X 1	lb	7 473	7.848
40	16 FVR R 11 1/2 X 1	7	4 1/2" X 1	lb	7 473	8.857
40	16 h R 12 1/2 X 1	3	6" X 1	lb	3 072	3.742
40	16 k R 12 1/2 X 1	2	6" X 1	lb	2 701	2.701
40	48 m R 8 3/8 X 1 1/2	1	3" X 1 1/2	lb	2 222	2.222
—	16 n HUB FORGING	1	HUB FORGING	lb	16726	16726
—	1 1/2 OD X 2 1/2 ID	2	1 1/2 OD X 2 1/2 ID	lb	2 8	2.8
40	16 PYR BUSHING BZ	16	PYR BUSHING BZ	lb	14200	14200
40	16 SYR BUSHING BZ	16	SYR BUSHING BZ	lb	14200	14200
25	1 1/2" DOWEL	12	1 1/2" DOWEL	lb	451	451
—	16 V 1 1/2 X 1 1/2	1	1 1/2 X 1 1/2	lb	446	446
—	16 W R 9 X 3/4	1	1 1/4 X 3/4	lb	477	477
—	16 AD R 9 X 3/4	1	1 1/4 X 3/4	lb	477	477
—	— OC BAR 1 1/2	72.0	OC BAR 1 1/2	lb	5146	5146
SHIP						
66	66	66	66	66	66	66
						TOTAL 435.812
MANUFACTURER		CONTRACTOR	COORS OFFICERS			
NO.		REQD.	RECD.			
1		OPEN HOLE, 1 1/2"	SHIPPED AS NOTED			
2		END AND EDGE DISTANCE	SHIPPED AS NOTED			
3		SPACING NOT SHOWN	SHIPPED AS NOTED			
4		NO SHOP PAINT	SHIPPED AS NOTED			
PACIFIC CAR AND FOUNDRY COMPANY 50 E. HODSON ST. PA 2-0800 SEATTLE, WASHINGTON 98102						
LITTLE GOOSE LOCK & DAM ITEM 101 SPILLWAY GATE VINNELL, MANNIX, FULLER, DILLINGHAM MCARHILL DATE 5-10-66						
BM#30 FOR CONVENIENCE CO. APPROVED COLD STEEL 12 MM/12MM APPROVED P.D. Kunkleman P.D. Kunkleman 39 2						
LIG 65-560-101-013						

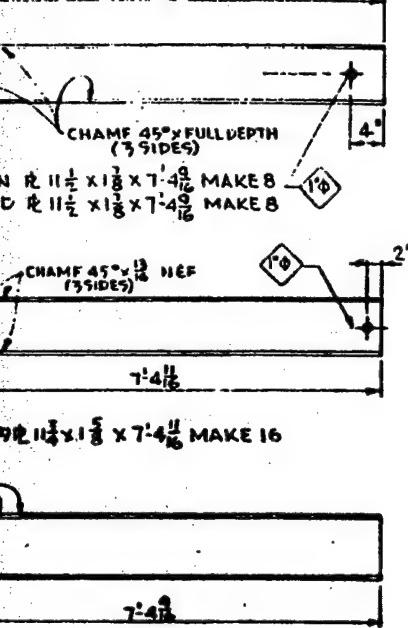
(3) MAR 19 1980

~~REVISIONS~~
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CA HILL
[Signature]



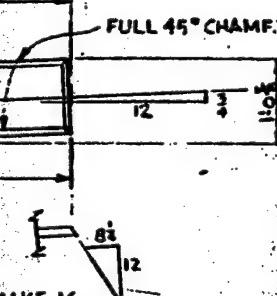
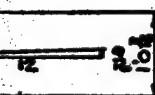


7-48



PAS SHOWN R 11 1/2 X 1 1/8 X 7 4/16 MAKE 8
STOP HAND R 11 1/2 X 1 X 7 4/16 MAKE 8

LL 45° CHAMP



GARDNER

CONTRACT NO D445-164 CIVENG 65-560

APPROVED

Subject to confirmation with plans and specifications, execution of orders or instructions, and in fulfillment of my required tests. Approved upon due review of drawings, or availability for consulting and discussing.

OFFICE OF DIRECTOR ENGINEER
LITTLE GOOSE LOCK AND DAM

— T.P.S —

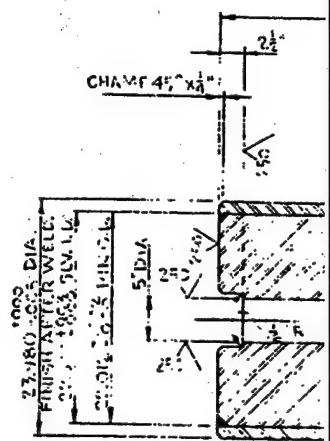
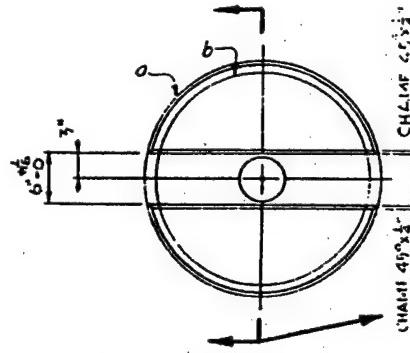
Date 2/20/66

BILL OF MATERIAL

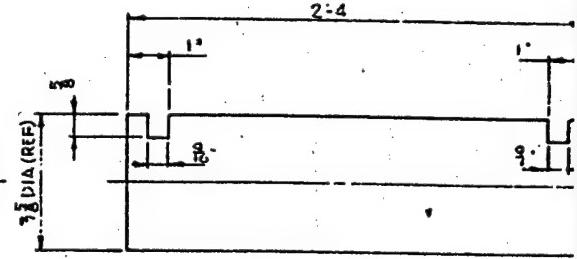
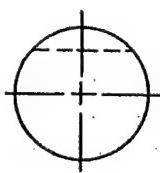
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REVISIONS
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MATERIAL SPEC
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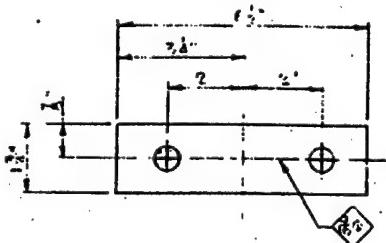
COLLECTED
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FOR ST. STL
SLEEVE
P/N K-1
CAHILL
11/8/66



16 MK 41A TRUNNION

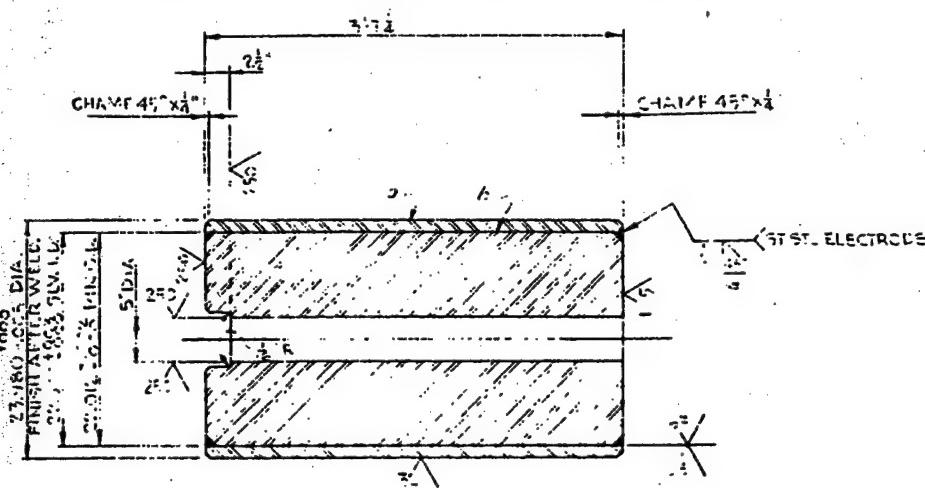


16 MK 41B LIFTING EAR 3/8"

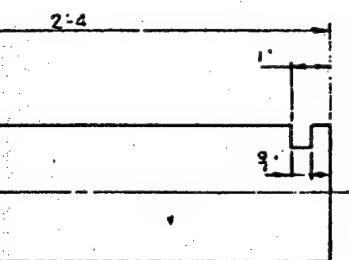


32 MK 41C KEEPER BAR EAR 1-1/2 X 1/2 X

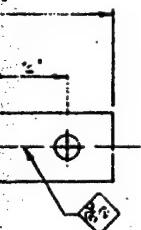
(1)



16 MK 41A TRUNNION PIN



B LIFTING PIN BAR 2 1/2 X 2 1/4



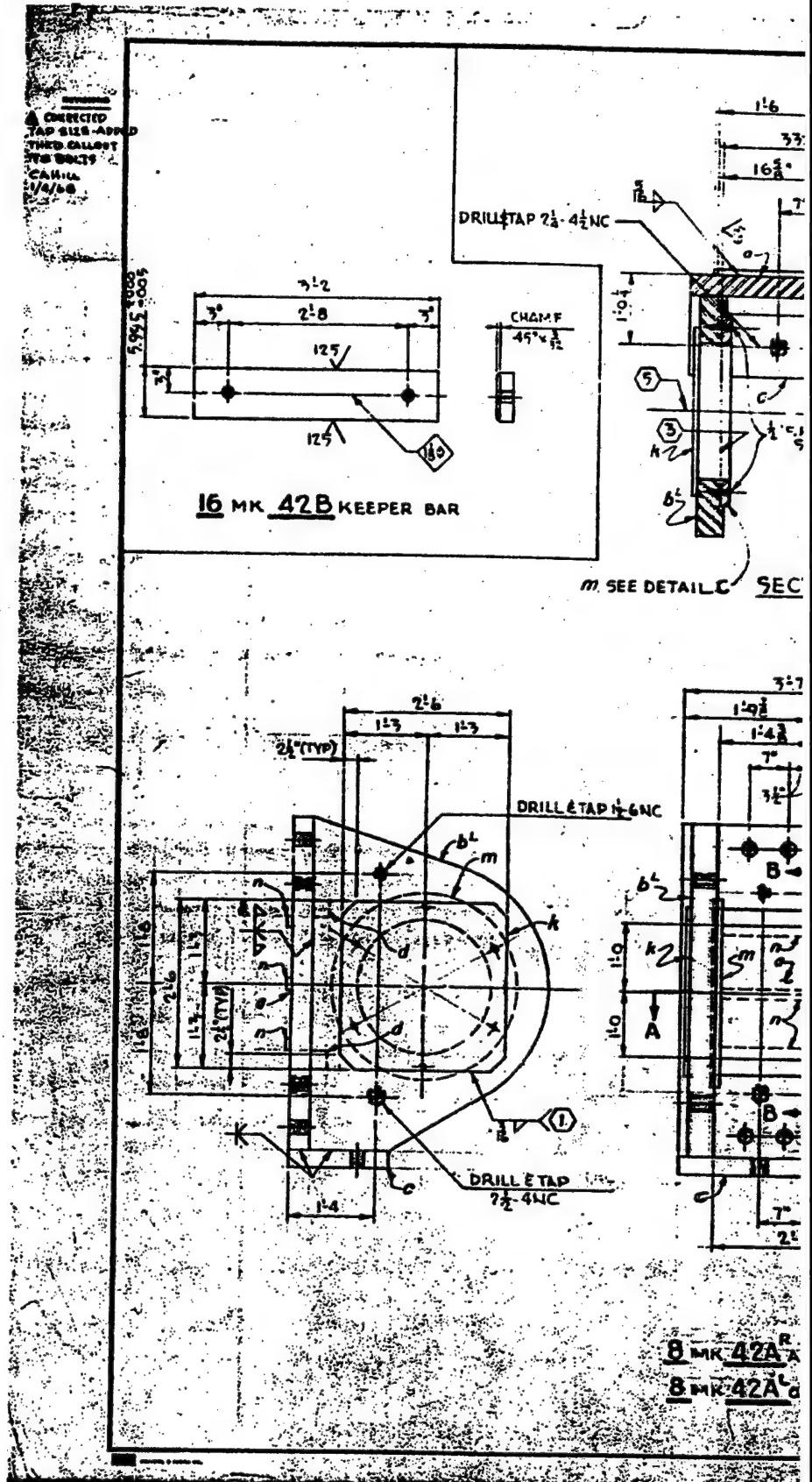
C KEEPER BAR BAR 1 3/8 X 1 1/2 X 0-6 1/2

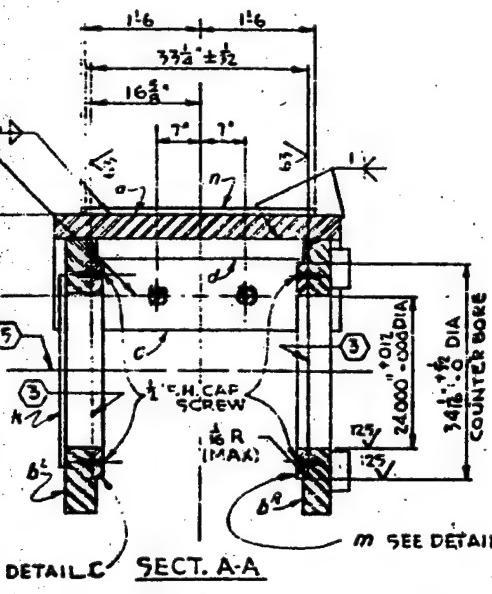
AS BUILT

CONTRACTORS DAMS-164-CIVENG-695

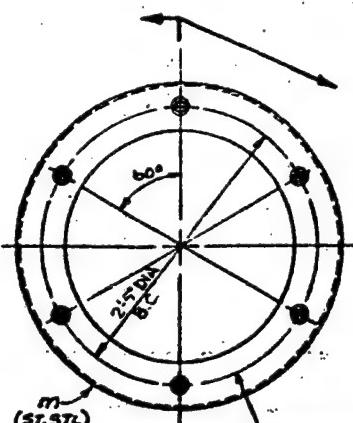
APPROVED AS CORRECTED	
Subject to contract terms and specifications. Execution of drawings is the responsibility of the contractor. Contractor shall furnish all parts and materials in accordance with the drawings and specifications, and to the satisfaction of the Engineer. All parts and materials shall be of good quality and shall be well made, free from defects, and shall be properly assembled, secured, and fastened.	
OFFICE OF RESIDENT ENGINEER LITTLE ROCK GULF AND DAM	
<i>[Signature]</i>	
Date:	10/26/69

(2)



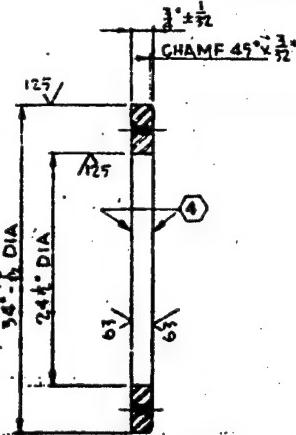


SECT. A-A

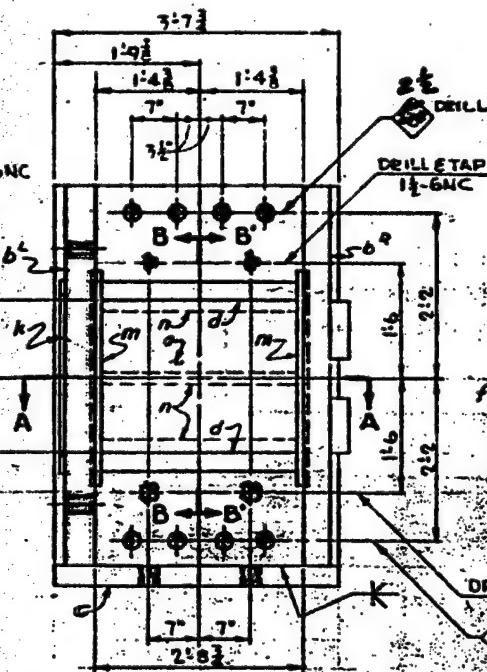


DETAIL C.

CSK TO GNE R TO CLEARANCE
BETWEEN FACE OF THRUST
WASHER & HEAD OF BOLT

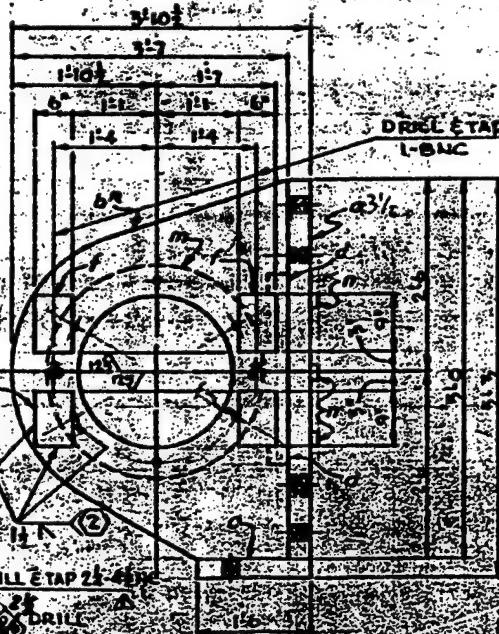


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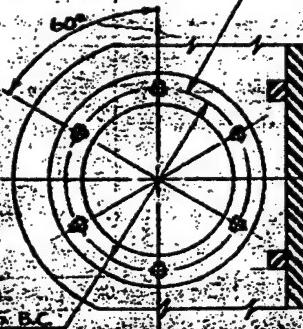


8 MK 42A R AS SHOWN

TRUNNION YOKE ASSY



DRILL &
TAP $\frac{1}{2}$ -13 NC X $1\frac{1}{2}$ " DEEP
TEMP PLATE FROM
PCP [NOT SHOWN]

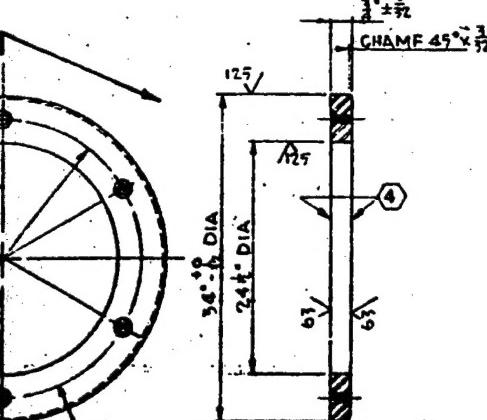


AS BUILT

APPROVED

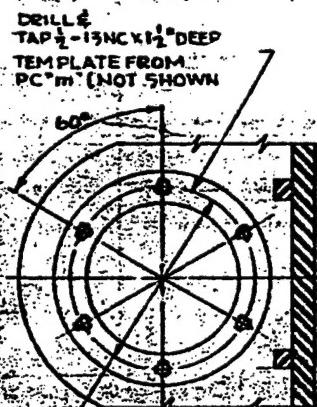
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**CSK TO GEAR TO CLEARANCE
BETWEEN FACE OF THRUST
WASHER & HEAD OF BOLT**

DROGÉTAP
I-BNC



AS BUILT
CONTRACT NO. DAU-A-14 CIVENG 67-360

APPROVED

the *Journal* of the *Academy of Natural Sciences of Philadelphia*, and to determine

...and the people of the land were afraid of him, and he was great in the land.

THE COUNCIL OF THE FEDERATION

LITTLE GOOSE LAKE AND ISLAND

卷之三

19. *Leucosia* *leucostoma* (Fabricius) (Fabricius, 1775: 400).
— *Leucosia* *leucostoma* (Fabricius), Linnaeus, 1758: 100.

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THE END OF THE EIGHTH BOOK

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MATERIAL SPEC:
PLATE & BAR ASTM-A36 EXCEPT AS NOTED
PLATE, ST. STL QQ-S-766B, TYPE 104 COND A
BOLTS, HIGH STRENGTH STL ASTM-A325 GR B5

NOTES

- ① WELD AFTER MACHINING HAS BEEN COMPLETED
 - ② WELD AT FINAL SHOP ASSEMBLY WITH TRUIMOND KEEPER BAR IN PLACE. SHEAR BARS ARE TO BEAR FIRMLY AGAINST KEEPER BAR.
 - ③ THESE SURFACES TO BE FLAT AND PARALLEL WITHIN .005" AND NORMAL TO E OF BORE.
 - ④ THESE SURFACES TO BE FLAT AND PARALLEL WITHIN .005".
 - ⑤ THESE HOLES TO BE LINE BORED AFTER STRESS RELIEF.
WELDMENT SHALL BE STRESS RELIEVED BY HEAT TREATMENT AFTER ALL WELDING IS CLEARED AS INDICATED BY NOTE (C) HAS BEEN DONE.
 - REFERENCE

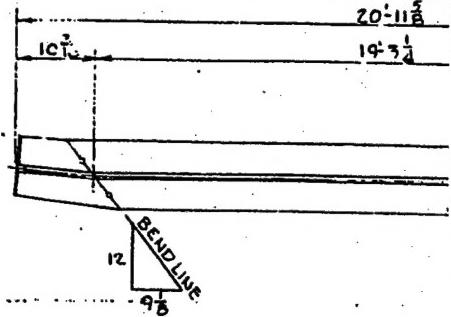
CORPS OF ENGINEERING NO 15-17-1/6 SH 190 VOL 1 REV
SPEC⁴ PG T PIG-1 SECTION 1 RECORD

MAR 19 1980

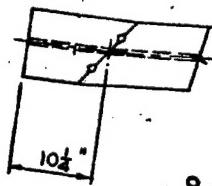
REVISIONS
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10-1-66 CANNILL
CAB

20'-11 $\frac{1}{2}$

19'-3 $\frac{1}{2}$



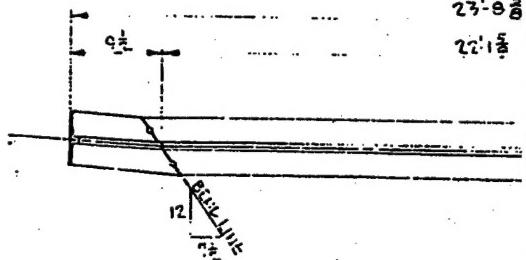
1/2 ON 4
12



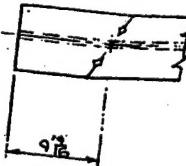
8 MK 43A^R AS SHOWN
8 MK 43A^L OPP HAND

23'-8 $\frac{3}{8}$

22'-1 $\frac{1}{2}$



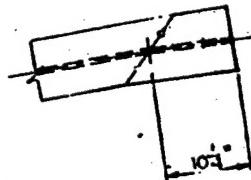
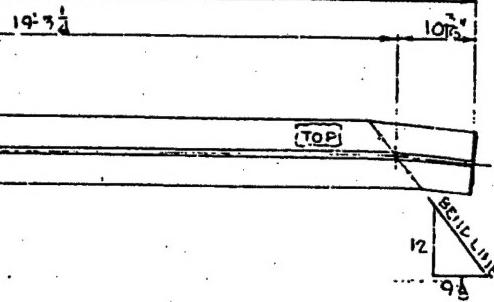
1/2 ON 4
12



8 MK 43B^R AS SHOWN
8 MK 43B^L OPP HAND

(1)

20'-11 $\frac{1}{4}$

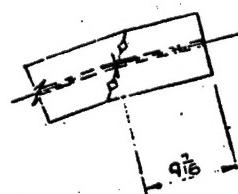


3A^R AS SHOWN
3A^L OPP HAND

ST7WF15 x 20-11 $\frac{1}{4}$

23'-8 $\frac{3}{8}$

22'-1 $\frac{5}{8}$



43-B^R AS SHOWN
43-B^L OPP HAND

ST7WF15 x 23'-8 $\frac{5}{8}$

AS BUILT

CONTRACT NO DA49164 CVENG 65-560

APPROVED

Subject to conformity with plans and specifications,
convention of errors or omissions, and to fulfillment
of any required tests. Approval does not cover detail
dimensions or accountability for assembling and
installing.

OFFICE OF RESIDENT ENGINEER
LITTLE COGGE LOCK AND DAM

— MRS —

Date: 18 Oct 66

(2)

MATERIAL SPEC:
SHAPES ASTM-A36

REFERENCE:
CORPS OF ENGR DWG NO LGDI-5-8/3 SHT 87 VOL I REV B
SPEC5: PAGE TP16-1, SECT 16

AS BUILT

CONTRACT NO. BMS-164 DIVENG-EE-E60

<p>APPROVED</p> <p>Subject to conformity with plans and specifications, convention of errors or omissions, and to fulfillment of any required tests. Approved does not cover detail dimensions, or availability for assembling and installing.</p> <p>OFFICE OF RESIDENT ENGINEER LITTLE COGGE LOCK AND DAM</p> <p><i>by RS</i></p> <p>Dated 78 Oct 6</p>
--

LTC 6 1974 C-101-017 399

3

MAR 19 1980